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The November Issue is a joint issue with Resurgence Magazine subject Religion and Ecology. This document is being prepared especially for the Ecologist conference on Ecology and Religion to be held on the 28th/29th November 1974, at Conway Hall, Red Lion Square, London WC1. For details see inside back cover of this issue.

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A Manifesto for Survival

"Sustained economic growth is the goal of all governments, both left and right wing, in both developed and under-developed countries, and although a diverse array of people have come to realise that in order to survive, growth must be controlled, there is at the moment no political party in the world that would adopt this as its manifesto and expect to come to power by either democratic or other means."

Professor D. F. Owen, who ends his excellent book, Man's Environmental Predicament with this rather despairing statement, could be forgiven the inaccuracy contained in it. After all PEOPLE was but a few months old when he wrote it. Today, less than a year after the appearance of his book, there is a political party in Britain (and others in Australia, New Zealand and Alsace) that has adopted, in its manifesto, not merely controlled growth but de-growth, and confidently expects to come to power by democratic means. The first National Party Conference held in Coventry in June 1974. formulated and agreed a "Manifesto for Survival" in which one reads: "PEOPLE intends to work towards a from growth-orientated transition society to one whose guiding principles are-minimum disruption of ecological processes; maximum conservation of materials and energy; a population in which recruitment equals loss; and a social system in which the individual can enjoy, rather than feel restricted by, the first three conditions."

Regular readers of *The Ecologist* will already be familiar with the history of PEOPLE to date. It was formed in 1973 as a direct consequence of the appeal in *A Blue-print for Survival* (*Ecologist* Vol. 2, No 1) for "a national movement to act at national level, and if need be to assume political status and contest the next general election."

PEOPLE has already fought one general election and is preparing for the next. Another milestone is now reached with the publication of its first official manifesto. Whatever may be its failings it is impossible to overemphasise the importance of the simple fact that it exists. The fact that, for the first time, a political party has dared to do what all other parties and successive governments have shirked and continue to shirk-to tell the political, economic and social truth. It is of little use that many politicians profess, in private, adherence to ecological views (and it is surprising how many in fact do so) if in public they continue to support the economics and ethics of the consumer society. Of course they plead that ecology wins no votes and so the charade continues. The myth of "progress" is maintained, the self-perpetuating vicious circle created by political promises, and public willingness to believe them, remains unbroken. The nightmare goes

on because they are all afraid to wake up. PEOPLE attempts to speak for those who are not afraid to face the truth, who have shaken themselves free of the dream/nightmare, and are prepared to take on the responsibility for the future.

The Manifesto will not please everyone. For some it will be too radical, for others too conservative. Thus while no immediate reform of the Parliamentary system is proposed, there are suggestions for taxing large farms out of existence and for reducing the optional school leaving age to 14. But these are details and they should not be used as an excuse for throwing the baby out with the bath water. The Manifesto contains the essentials of a sound policy system of de-growth, decentralisation, devolution and population control. Above all it is an honest attempt to provide a working basis for ecological government. It is also refreshingly unpretentious. I quote from the introduction: "PEOPLE does not claim to know all the answers, merely to be looking for them in a new direction."

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OBSOLETE ECONOMICS by JOHN ADAMS

Modern economics have diverged very radically from the Oeconomica of Aristotle, and is increasingly out of touch with reality. It provides no satisfactory method for dealing with non-economic factors, such as the mass of problems resulting from the damage caused to biological and social systems by the growing industrial machine. In this article the author develops the thesis that economic activity should now be reduced to a scale more in keeping with its original definition "the study of household management".

In this paper I consider the contribution that economics might make to the solution of two rather large problems. The first is the possibility that if the world continues on its present path it will destroy itself. The second is the increase in the number of people who appear to feel that it does not matter if it does.

The existence of these problems has been acknowledged by some of the stoutest defenders of the present economic orthodoxy. Lipsey, for example, in *Positive Economics* (1973 edition), discussing what he calls the "non-economic costs" of economic growth, concludes "today there is debate and uncertainty as to whether or not the final bill (for economic growth) would include disaster and destruction for the human race itself". And Samuelson in *Economics* (1970 edition) notes that a symptom of stress which seems to

accompany economic advance in the "advanced" countries is a "disquieting search for meaning and purpose in life". This symptom is attributed to "the existential vacuum".

There is no shortage of prominent economists to be found expressing similar anxieties. There is a burgeoning literature on the topic. Perhaps the most concise and representative expression of the current economic angst is to be found in the Dai Dong declaration, Toward a Human Economics. This is a statement sponsored by 21 "distinguished" economists from seven different countries, which, the sponsors hope, will be signed by thousands of other economists throughout the world. Their analysis is worth examining for the reason given in the declaration itself: "The power of the economists, and therewith their responsibility, has been very great indeed."

Their broad view of the problem is set out in the declaration's first paragraph:

"The evolution of our global household earth is approaching a crisis on whose resolution man's very survival may depend, a crisis whose dimensions are indicated by current rates of pollution expansion, runaway industrial growth, and environmental pollution, with their attendant threats of famine, war, and biological collapse."

This state of affairs they point out has been arrived at not through the operation of inevitable laws of nature but through a history of decisions in which economists particularly recently, have been influential participants. What is needed now, they argue, is "a new vision".

According to the declaration, the principle defect of the *old vision* is

"the economist's traditional that measure of national and social health has been growth". This vision, permeated by a spirit of confident purposiveness, can be found elaborated in libraries full of economic texts and journals. The old economists knew where they wanted to go and on the whole were confident that they knew how to get there. The old vision is characterised by the Keynesian confidence that "mankind is solving its economic problems" (Keynes 1930). This confidence is exemplified by the conclusion to an early edition of Samuelson's Economics (1955)* written before he had begun to worry about things like existential vacuums. It describes the kind of state of which the economist could be proud to be a citizen:

"We may conclude on a note of profound optimism. The American economy is in better shape in the 1950's than it ever was in the past. At the present time, possessing only 6 per cent of the world's population, it produces some 40 per cent of the world's income. And with all its defects, it has behind it a record of the most rapid advance of productivity and living standards ever achieved anywhere. Our mixed economy wars aside—has a great future before it."

In view of the increasing publicity given to anti-growth arguments it is easy to forget how very solidly entrenched such attitudes still are. Economists such as Professor Beckerman who are prepared to defend growth explicitly may well now be in a minority among academic economists. But the objective of growth remains at the core of the economic policies of

* Economics has been through a number of editions. The changes that have been made between the 3rd and 8th editions suggest that the foundations of Samuelson's thorough-going materialism, while still strong, are being nibbled at by doubts. For example, in both editions, the chapter dealing with the problems of economic growth is prefaced by a quotation from Francis Hackett which begins: 'I believe in materialism.' Also both contain the equation material consumption

Happiness =

desire

with the suggestion that there is a universal consensus that progress is to be achieved by increasing the numerator. The 8th edition however contains a footnote: "In affluent America or Sweden, particularly among high-income college students, there is a discernible trend away from materialism." every major political party in this country, of the Confederation of British Industries and the trade unions, and is even enshrined, as Article 2, in the Treaty of Rome.

The purposes of the new vision economics are decidedly less clear. We are told in the declaration that we must not succumb to gloom and despair. We must not be sucked into the existential vacuum of hopelessness. We must strive, we are told, for a world in which it is possible to live with "dignity", "hope" and "justice"; we must have "a new order of priorities", "reshaped values" and "a more humane" vision. But above all we are told-and this is the only area in which the declarations vision is specific-economists, because they are important and influential people, have a major role to play in the recording and reshaping involved in "the management of our earth home".

The Economist's Perspective

Most of the concerns of the declaration I share, But in its principle prescription I find cause for greater concern. That many of us need our visions improving I do not doubt. But that this can be assisted by "a clear formulation from the economist's perspective of the choices before us" I very much doubt.

When I was critical of the perspective of economists in an earlier paper in the *Ecologist* (Adams, 1973) I was accused, in a letter to the editor (Pearce, 1973), of unfairly damning all economists for the sins of some economists and was held up as an example of someone who was overeager to comment on a discipline he knew nothing about. Such a comprehensive assertion of my ignorance I naturally found very worrying and I took immediate steps to find out if it was true—I consulted my Oxford English Dictionary to find out what the word "economics" meant.

I discovered that "economics", according to my dictionary's primary definition, meant "the study of household management". And in pursuing the Greek origins of the word I came upon Aristotle's *Oeconomica* which was full of common-sensical advice about the arrangement of domestic activities most conducive to affectionate and harmonious relations within the family. This was certainly not the sort of thing I had been intending to criticise.

Next I came upon E. F. Schumacher's Small is Beautiful: a Study of Economics as if People Mattered. This is also not the sort of thing I had been intending to criticise. It is a collection of eminently sensible essays inquiring into the malaise that seems to be affecting the whole of the industrialised world. It is based firmly on the presupposition that people matter. In it Schumacher argues a number of points with economists in their own termsfor example, the common confusion between capital and income in discussions about natural resources[†]—but his most telling criticisms are of the terms themselves. In the chapter entitled "Buddhist Economics" he argues most persuasively that the highly sophisticated calculations of convential economics, based on the assumption that the only things that matter to people are things that can be cash quantified, not only provide no nourishment for the soul but will ultimately destroy the material basis of human welfare as well.

Economists such as Professor Beckerman who are prepared to defend growth explicitly may well now be in a minority among academic economists. But the objective of growth remains at the core of the economic policies of every major political party in this country.

Schumacher's understanding of the word seemed to me to be in sympathy with Aristotle's use of it and consistent with my dictionary's definition. I had indeed, it seemed, been unjustly maligning some economists. However, on the verge of confessing this sin I inquired into the meaning of the asterisk which accompanied my dictionary's definition of the word, and discovered that the definition was now deemed obsolete.

Obsolete economics seems to me to be a wholly admirable study, and were the new vision of the Dai Dong declaration to embrace it I would enthusiastically embrace the declaration. But in their aspiration to participate in the management of the global household the declaration's

[†] The traditional and still pervasive view is that sustained growth assures *more* for everyone in the future. Schumacher's view is that it will ensure disastrously *less*. One's choice of view seems to depend on whether one views resources as capital, which is natural and finite, or as income capable of infinite expansion through human technological ingenuity.

economist sponsors are, instead, embracing a dangerously misleading metaphor.

In the indignant letter to the editor of the *Ecologist* referred to above, David Pearce, who is one of the sponsors,* spelt out what he believes to be the principle distinguishing virtue of up-to-date economics:

"Economics, more than any other discipline, proceeds on the basis of setting out what—to use the jargon we would call an 'objective function' —i.e. saying what we aim to maximize or achieve—and looking at problems in this light."

And to drive the point home he asks: "And while we are at it, what do geographers (meaning, I presume, me and my ilk) maximize?"

The term "objective function" seems to have become fashionable in the jargon of economics with the development of linear programming, but the ideal of maximising some unitary index has been around in the subject for some time. It is to be found in Pigou's discussion (1920) of the nature and limits of the subject; economics, according to Pigou, was the study of that part of welfare that could be brought into relation with the measuring rod of money. Measured with this rod, that which was biggest was best.

Pigou conceded that economic welfare was not the whole of welfare, and that the boundary between the economic and non-economic was a murky one. He also conceded that on occasion the economic and non-economic could be in conflict. He concluded, however, that as a general rule it was safe to proceed on the presupposition that "the effect of an economic cause on economic welfare will hold good also for the effect on total welfare". Further, "in all cases the burden of proof lies upon those who hold that the presumption should be overruled". In other words Pigou was saying that economics should proceed on the presumption that God and Mammon are the best of friends and that it is up to those who feel otherwise to disprove it.

* To the extent that Schumacher, who is also one of the sponsors, shares the declaration's enthusiasm for global management, I find his position inconsistent with the small-isbeautiful theme of his book. Rather than suggest that he should be known by the company he keeps I would prefer to interpret this association as part of a campaign to persuade the global managers among the sponsors to the point of view found in his book.

This view remains characteristic of up-to-date economics. Keynes elevated the solution of "the economic problem" to the status of a precondition of improvements in non-economic welfare; only after economic necessity had been eliminated, he argued, could society afford to abandon the measuring rod of money as its standard of progress. Only after Mammon had been appeased could man get on with his "real, his permanent problem" of how to live "wisely and agreeably and well". But most commonly the economic and non-economic have been seen as nothing but the most congenial of companions. This close friendship was viewed by Kaldor as the very foundation of scientific economics:

Obsolete economics seems to me to be a wholly admirable study, and were the new vision of the Dai Dong declaration to embrace it I would enthusiastically embrace the declaration.

"The scientific status of the economist's prescriptions is unquestionable, provided that the basic postulate of economics, that each individual prefers more to less, a greater satisfaction to a lesser one, is granted."

This last statement of Kaldor's was offered as a refutation of Robbins' argument (1938) that the scope of that part of economics that could reasonably be called "scientific" was severely restricted by the impossibility of making interpersonal comparisons of utility. This argument between Kaldor and Robbins took place over thirty years ago but Kaldor's "refutation" remains typical of the sleight of mind with which economists still evade the problem that there are at least as many measuring rods of satisfaction as there are people.[†]

The "scientific" conclusion that Kaldor derived from his basic postulate was set out as follows:

"In all cases, therefore, where a certain policy leads to an increase in physical productivity, and thus of aggregate real income, the economist's case for the policy is quite unaffected by the question of the comparability of individual satisfactions."

If all satisfactions were capable of being measured by the same monetary yardstick then Kaldor's "aggregate income" might be, in some sense, "real"; but they aren't, so it isn't. For the same reason an objective function, with terms purporting to represent the satisfactions and dissatisfactions of a number of different people, is equally unreal. It is the viewing of problems in this unreal light that makes both the old (as distinct from the obsolete) and the new economic visions characteristically economic.

The Economist and the Non-Economic

The economist confronting the noneconomic is but a special case of a more general and increasingly common phenomenon—that of the social scientist confronting the unquantifiable. Certain standard ploys are resorted to in such situations.

The first, perhaps most popular with certain behavioural psychologists but not unknown among economists, is to quote Lord Kelvin to the effect that if something cannot be measured it cannot exist. This is certainly the neatest way of dealing with the problem.

A second ploy, much more common with the old vision economists, is to pay lip service to the idea that unquantifiable, non-economic factors exist but then to imply, by ignoring them, that they are of no real importance. This was Pigou's way of dealing with the problem and it is also Lipsey's in the most recent edition of Positive Economics (1973). That sustained economic growth might result in global disaster is an anxiety which did not appear in the first edition of his book but which is found in the third, incongruously inserted in a context which equates economic growth with progress. The passage which follows immediately after Lipsey's discussion of the non-economic costs of growth is

† Robbins, having won the argument, immediately handed it back to Kaldor; in order to salvage economics he agreed to assume what he had demonstrated he could not prove:

"I am distressed that anything that I have said should give rise to recurrent dispute which suggests to the outside world a disunity among economists which I am persuaded does not exist... They (his critics) think that propositions based upon the assumption of equality are essentially part of economic science. I think that the assumption of equality comes from outside and that its justification is more ethical than scientific. But we all agree that it is fitting that such assumptions should be made and their implications explored with the aid of the economist's technique." headed "Opportunity Cost of Growth" and is a presentation of the conventional idea that the optimal rate of growth is the one in which the value of present consumption sacrificed is just equal to the present value of the extra future consumption that would result from the sacrifice. Indeed the whole of the rest of the book is permeated by the assumption that economic growth is good.

The second ploy, like the first, has certain obvious disadvantages and is now being superseded by a third, that of the new vision. The new-vision method is to call non-economic factors "externalities" and then to set about "*internalising*" them. Internalising a factor consists essentially of attaching a "externalities" which threaten global disaster. The ones we know about include the radiation hazards associated with nuclear technology both military and civil, the prospect of mass poisoning by persistent toxins such as mercury and DDT working their way up global food chains, the possibility that oil pollution at sea might reach levels which would damage life below the surface and disrupt the climate above it, and the fear of catastrophic maninduced changes in the carbon dioxide content, and perhaps also the ozone content, of the earth's atmosphere.

Threats like this, viewed from the economist's perspective, present some rather awkward problems. The first is that of selecting the significant factors

and revenue estimates for its operation. But these are difficulties with factors which are well within the conventional domain of economics. Beyond these lie a multitude of externalities: the engine noise, the sonic boom, the danger to both passengers and those on the ground, the social consequences of providing extremely rapid transport for a tiny minority of the world's travellers, and of course the ultimate externality, the possibility that a fleet of Concordes just might catastrophically alter the world's climate. These are just some of the externalities that have featured in the Concorde debate. On none of them is there a satisfactory agreement about how these effects might be measured. The engine noise debate is complicated



cash value to it. It is not pretended, of course, that the process of attaching cash values is simple. But once it has been accomplished, all sorts of benefits follow; the factor can have its supply and demand characteristics analysed, it can take its place in an objective function or a cost-benefit analysis, it can even be framed and hung as a chart on the office wall. The benefits, it seems, are so great and so obvious that vigorous efforts are presently being made to pin down the "value" of things like beauty, peace, quiet, friends and, most ambitiously of all, life itself. This strange stratagem is distinguishable from the first only by the fact that its practitioners refrain from insisting explicitly that everything must, in principle, be quantifiable. They simply behave as though it must.

Global Externalities

Let us now consider some of the

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to include in the analysis of the problem, the second is that of measuring them once they have been identified, and the third is that of estimating the parameters which will transform the measurements to cash so that they can be entered into an objective function.

The last of the externalities listed above will serve to illustrate the difficulties involved. How might the light of objective function maximisation illuminate the question of whether the "benefits" of supersonic flight might destroy sufficient ozone in the upper atmosphere to alter the world's climate? Or, if one were to be even more ambitious, how might one begin to conduct a comprehensive cost-benefit analysis of the Concorde programme? For a start one would have to come to grips with the well-publicised difficulties of producing reliable cost estimates for the research, development, and manufacture of the plane, and, reliable cost

by conflicting claims about the sensitivity of people to different sound frequencies and levels, and the number of flights, and of course the problem of reconciling the reactions of the hypersensitive with those of the "imperturbable". Similarly the sonic boom has consequences which apparently affect different people in different ways-it has even been seriously suggested, by a spokesman for Concorde's makers, that Arabs in the desert might actually like the boom. The danger to passengers, particularly foetuses, from radiation and the greater risk of accidents that accompanies new and highly complex technologies are, at best, extraordinarily difficult problems to attach meaningful numbers to. And whether providing a new super mode of travel for the important few is a benefit to the world is a matter that many dispute. Finally, the possibility that a fleet of high-flying Concordes might

damage the ozone layer is a risk that, in the present state of ignorance about the upper atmosphere, cannot even be discussed in terms of probabilities.

If we go beyond these fairly direct consequences of Concorde and pursue some of the project's wider ramifications then we find ourselves encroaching on all the other externality problems on our list. Concorde's voracious appetite for fuel would contribute to the problem of oil pollution and hasten the need for alternative forms of power such as nuclear energy. In a rather less direct way, through its contribution to economic growth (if it were to be "successful") it would assist a great range of economic activities which have "side effects" on a global scale.

Thus far we have identified, albeit not very confidently, the major factors that might be included in an analysis of the Concorde project and discussed the nature of what might be called "primary measurement problem", the problem of physical measurement by whatever might happen to be the most obvious scale. Beyond all this, and before it could be of any use in a costbenefit study or an objective function, lies the problem of ascertaining what it is all worth.

Faced by such overwhelming complexity the social scientist says "we must simplify, we need a model, a selective representation of the problem which captures its most important features", and, so far as I know, there is no other way of dealing with magnitudes and complexities beyond normal human powers of comprehension. But what do their models of the Concorde problem look like? Do they capture what is really important about the problem? I suggest not.

I have seen no economic formulation of the Concorde problem that deals with the externalities discussed above except in passing asides. The debate both in the press and in Parliament about the future of Concorde has been dominated overwhelmingly by the economist's perspective. As a result it has concentrated on the relatively trifling question of whether the plane is likely to show an operational profit. Anxieties about all the other external problems have been met by assertions that they are not serious, or, more commonly, by embarrassed silence. That most people do not like to be startled, or awoken, by frequent sonic booms is a fact every bit as "hard" as

any sum at the bottom of a financial statement. And so is the fact that none of the routes proposed for Concorde can avoid doing this. Yet facts such as these, because they cannot be readily reduced to a form in which they can be compared to operating profits, are treated as though they are of no real importance. The economist's perspective, in the Concorde debate, far from illuminating the problem of externalities has assisted the conspiracy to ignore them.

For issues such as this, characterised by unknown risks of incurring incalculable costs, the perspective of the up-todate economist is worse than unhelpful. In perhaps the ironically entitled "Growth Mania Revisited" Professor Beckerman (1973) argues that subtle, global scale threats, such as the buildup of carbon dioxide in the earth's atmosphere, rank lower on the list of concerns of "the average worker" than pollution problems of a more local scale, and, he adds, "rightly so". To express concern about wider and perhaps future threats to the world is to participate, it seems, in a deplorable middle-class conspiracy to divert attention from the real needs of the workers. Professor Beckerman does not seem to value the future very highly, perhaps because he is an economist working in inflationary times and accustomed to dealing with large discount rates. In the same article he has this to say about the future:

"Anyway, why on earth should anybody make any sacrifices to keep the human race going any longer than necessary? Extending the duration of the human race merely means that a few billions more people will be born in order to die as well. Why is that such a big deal?"

Operationalising Ethical Principles

Professor Beckerman may of course have been indulging his penchant for facetiousness but if so it would be interesting to know what he really thinks about the matter. How should or could the economist embrace such issues within his maximising framework? He says "the problem of the desirable rate of growth is a problem of the best way to allocate resources *over time*". This formulation of the problem is essentially the same as the "inter-generational equity principle" proposed by Mike Common (1973), one of Professor Beckerman's econ-

omist critics. Common says "a sensible ethical goal might be to bequeath to our successors as large a range to choose over as is consistent with some minimal standard for ourselves". However, Common observes, before this can be of any use "we need more information on how the socio-economic system now operates (and) an operational specification of the ethical principles". In the ecumenical spirit of Dai Dong he concludes "both requirements can only be met by a massive, inter-disciplinary, research truly effort."

The debate both in the press and in Parliament about the future of Concorde has been dominated overwhelmingly by the economist's perspective. As a result it has concentrated on the relatively trifling question of whether the plane is likely to show an operational profit.

In the debate about economic growth within economics, each side frequently accuses the other of having insufficient empirical evidence to support its optimistic/pessimistic conclusions. No doubt more factual information could clear up a number of minor areas of dispute within the debate, but no amount of inter-disciplinary research will ever yield an operational specification of the "inter-generational principle" that the economist can use to run his maximising models. Because there is no way of measuring whether I like rice pudding more than Professor Beckerman likes Beethoven quartets there can be no way of measuring whether the pleasure of David Frost riding in Concorde to New York is worth more than the suffering of a Grand Bank fisherman caused by Concorde's sonic boom, let alone the possible suffering of some future victim of skin cancer caused by the depletion of ozone. Beckerman and Common seem agreed about the desirability of information transformed by more operational definitions to fit the economist's perspective. Their difference would seem to lie in the realm of discount rates, and speculation about whether growth increases or decreases the range over which our successors will be able to choose. Neither of these differences can be resolved by an appeal to economic "facts".

The larger the scale on which the economist is working, the more disturbing are his endeavours to reduce ideas like distributive justice and intergenerational equity to economically operational terms. With quantified models, operational necessity dictates not only that all factors be related to each other by means of a common measuring rod, but also that the complexity of the relationships being modelled and the quantity of information contained in the model be reduced to manageable proportions. Even with

the very largest of new computers the gulf between the amount of detail and complexity embodied in a global scale social problem and the amount that can be modelled with the help of a computer is incalculably vast. The troublesome problem of interpersonal comparison of utility becomes superseded by problems of intergroup, interregion and inter-nation comparisons of utility. As the economist works up this hierarchy, the arbitrariness of the assumptions necessary to overcome the problem, at its lowest level, become magnified. How does one compare the Cublington residents' enjoyment of peace and quiet with the Essex birdlovers' enthusiasm for Brent geese?

How does one reconcile the conflict of interest between the hundreds of millions of additional visitors who are presumed to want to come to London in future years with the possibility that the future residents of London might resent the transformation of their city required to cater to these visitors? Or how might one compare the uncertain damage done by Strontium 90 to the uncertain benefit of a nuclear weapons testing programme? The larger the scale of the problem being discussed the more simplistic it seems must be the quantified model of it.

So long as economists try to contain their new vision within the traditional continued



perspective of their discipline not only do they stand no chance of making a helpful contribution to the solution of the problems we have been discussing, they stand a good chance of making them worse. Professor Beckerman, who seems well content with the old vision, demonstrates why. In his dismissal of anti-growth arguments as either misguided or hypocritical, he derides the middle-classes "that are now so vociferous in the ostentatious parade of their concern for the higher spiritual values of life and the violence done to their exquisite aesthetic sensibilities by the pollution of the environment". If one's perspective provides no operational definition for spiritual values and aesthetic sensibilities, then labelling them middle-class and heaping scorn upon them is perhaps as good a method as any of defending this perspective. But as a method for reassuring those anxious that continued economic growth might have undesirable consequences which lie beyond this perspective, it will not work. And trying to internalise spiritual values and aesthetic sensibilities into a perspective which is exclusively materialistic cannot help.

The Existential Vacuum

Consider the following vision of Utopia found in a Resources for the Future anthology entitled *Energy*, *Economic Growth and the Environment.* It is called "The Erehwon Machine".

"Operating on natural, self-renewing sources of energy, it generates power with an efficiency approaching 100 per cent and still makes beneficial use of its minute amount of waste heat. Anticipating public life-styles, provides durable goods and ît efficient services exactly matching fluctuating demands and distributes these goods and services equitably to all people. It recalls all waste, reduces the waste to its elemental form, then recombines it as basic materials with needed new resources that the machine extracts from nature with a negligible environmental impact.

The Erehwon Machine is selfadjusting to a changing labour market; it provides retraining to workers as it upgrades itself and administers welfare to all it cannot employ. To the unemployed and unemployable, it offers satisfying leisure activities and psychological reorientation to a nonwork ethic. And in doing all this for man and nature, it still shows a profit to its stockholders and a favourable effect on the international balance of payments."

It is a world custom built for social engineers. It is a mechanised world, inhabited by components, and its sole function is to run smoothly. The most exhaustive scrutiny of the machine reveals neither meaning nor purpose. It is the existential vacuum made manifest.

Although Professor Seaborg, the author of this vision, concedes that it is a bit much to hope for, he says: "Seriously, I think much if not all of the tasks I have assigned to the Erehwon Machine is what most of us would like to take place."

The family, like Aristotle's state, is by its nature, restricted in size. One of its defining characteristics is that its members know each other and have at least the possibility or recognising each other's due.

Seaborg, the former chairman of the United States Atomic Energy Commission is not an economist but, so far as up-to-date economists are concerned, I am sure he is right. The economist's vision of the machine, however, has an impressive refinement; all its components are interchangeable. Peace and quiet, Brent geese, children's time, Norman churches and human life are just some of the indistinguishable parts used in the construction of the recently scrapped Roskill prototype. And where, in the attempt to construct much larger machines, it is found that economic science is not "as yet" capable of measuring certain "human factors", then the traditional presumption inevitably prevails that it is best to proceed by maximising the objective function which contains all those things which can be measured. Whether the economist is an old vision sort who prefers to lay the non-economic quietly to one side, or a new vision sort who believes in striving to internalise everything, he proceeds on the assumption that what is pleasing to Mammon is pleasing to God.

Justice and Responsibility

The question of increasing atmospheric concentrations of carbon dioxide was raised by Professor Beckerman in order to dismiss it as being of no concern to the workers. The question is, of course, one of many modern variants on the old "problem of the commons". The modern variants are more difficult for two reasons. The collective responsibility for protecting the global commons is dispersed over more people, and, it is harder to judge the carrying capacity of the world's oceans and atmosphere than to estimate the number of cows or sheep that can be carried on a patch of grazing land without damage. For both reasons it is more difficult for an individual to appreciate his responsibility to the collectivity.

As the threat to the global commons increases and individual responsibility grows more tenuous the need becomes greater, we are frequently told, for more centralised decision making and control. This would involve, it is conceded, "the diminution of what we now call 'individual freedom' ". But this should present no problem to an Erehwon Machine; if it can overcome what we now call "unemployment" by a dash of welfare and a course of reorientation which psychological makes us see it as leisure, then surely it can find a less emotive term for what we now call "individual freedom".

And if individual freedom goes then of course the machine can also dispense with what we now call "dignity", "hope" and "justice". A crankshaft has no self respect, a fan belt cannot hope for better things, and an air filter cannot resent the injustice of being thrown out when worn out. The mechanic concerned about the efficient operation of his car would be silly to worry about the sensibilities of its individual components. And if they failed to function properly he would be even sillier to blame them for irresponsible behaviour. The components of a machine are expected to be blindly and mechanically obedient; if they are not they are expendable.

Whenever human problems grow beyond human size their "solution" must become to some degree impersonal. Everywhere problems seem to be growing in size and everywhere the solutions proffered more abstract and mechanical. As impersonal criteria such as maximisation, efficiency and stability assume more importance, obedience supplants responsibility as the criterion by which individual components of the societal machine are judged. Sitting obediently in one's car in the small hours of the morning with no traffic in sight waiting for a traffic



light to give permission to proceed is the sort of behaviour which must be increasingly redefined as "responsible".*

Aristotle, who is frequently claimed by economists as one of their discipline's founders, was much concerned with problems of justice, responsibility Justice, according to and scale. Aristotle, consists of the allocation to each individual of his due. It is "essentially something human" and "alone of all virtues is thought to be 'another's good' because it is related to our neighbour". The whole of Aristotle's discussion of how this ethical principle might be "operationally specified" assumed a society in which people could know each other: "... and if the citizens of a state are to judge and distribute offices according to merit they must know each other's characters."

This is a theme which runs consistently through Aristotle's discussion of ethics and politics :

"You cannot make a city of ten men,

and if there are a hundred thousand it is a city no longer... So for friends too there is a fixed numberperhaps the largest number with whom one can live together; and that one cannot live with many people and divide oneself up among them is plain. Further, they too must be friends of one another, if they are all to spend their days together; and it is a hard business for this condition to be fulfilled with a large number. It is found difficult, too, to rejoice and to grieve in an intimate way with many people, for it may likely happen that one has at once to be happy with one friend and to mourn with another ... It would seem actually impossible to be a great friend to many people . . ."

Such ideas were developed in a world that exists no longer and will not exist in the foreseeable future. But so long as we choose to mean by "friendship" what Aristotle meant when he used the word, and so long as we mean by "justice" what he meant, we cannot dismiss them as being obsolete.

"Dai Dong" apparently comes from an ancient Chinese proverb in which "not only a man's family is his family, not only a man's children are his children, but all the world is his family and all children are his". The economics profession, if I understand the use made of the metaphor in the declaration, is being invited to assume its responsibility as principal adviser on matters of household management to the heads of this household. The metaphor breaks down for reasons recognised very clearly by Aristotle:

"To the size of states there is a limit, as there is to other things: plants, animals, implements; for none of these retain their natural power when they are too large or too small, but they either wholly lose their nature or are spoiled...when of too many, though self-sufficing in all mere necessaries, as a nation may be, when it is not a state, being almost incapable of constitutional government. For who can be the general of such a vast multitude, or who the herald, unless he have the voice of a stentor?"

The family, like Aristotle's state, is, by its nature, restricted in size. One of its defining characteristics is that its members know each other and have at least the possibility of recognising each other's due. I can see no possible interpretation of the family metaphor which does not invest the global head of household with responsibility unprecedented in power and scope and which does not assign to most of the people in the world the role of obedient children—children with no dignity and no hope of ever growing up.

The global household earth was described over forty years ago by Aldous Huxley in *Brave New World*. In an introduction to the edition reprinted in 1946 he outlined the stark choice facing not only the economists but everyone else in the world as well:

"... unless we choose to decentralise and to use applied science, not as the end to which human beings are to be the means, but as the means to producing a race of free individuals, we have only two alternatives to choose from: either a number of national, militarised totalitarianisms, having as their root the terror of the atomic bomb and as their consequence the destruction of civilisation (or, if warfare is limited, the perpetuation of militarism); or else one supranational totalitarianism, called into existence by the social chaos resulting from rapid technological progress in general and the atom revolution in particular, and developing, under the need for efficiency and stability, into the welfare-tyranny of Utopia. You pays your money and you takes your choice."

^{*} Seaborg introduces his Erehwon Machine "with apologies to Samuel Butler". Butler would almost certainly have refused them. In the preface to the second edition of Erewhon (they spell it differently) he says that whoever would deny men's responsibility for their actions "is an enemy who deserves no quarter".

Obsolete economics

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Cultural Pollution in a Consumer Society

by PETER ABBS

Advertising begins its insidious influence over the minds of very young children even before they can read. It provides a spurious mythology which replaces the traditional legends and fairy tales of childhood by the synthetic heroes and myths of a consumer society.

The main task of English teaching is to develop an imaginative discipline, a discipline providing a frame-work within which, through the creative and integrating power of the symbol, children can come to possess their own experience. It is also the intention of the teacher and part of the discipline he seeks to establish, to relate the varied expressions and images of the child to a common heritage of literature, which constitutes a major part of the embodied life-wisdom of the human race. Such a discipline can be interpreted as an elaboration of the relationship between mother and infant where an elementary but essential process of innovation and tradition, spontaneity and interpretation, takes place all the time. And just as the success of the mother-infant relationship relies on an encompassing trust, so, I would suggest is it in the classroom and in the tutorial; children and students will only present themselves through their writing, art and drama if they are inwardly

convinced that the teacher or tutor will respect and attend to both what is seriously created and what it may signify. In brief, *English teaching as a* subjective discipline presupposes the inter-relaxation of three primary energies: the need to symbolise, the need for culture and the need for trust.

It is urgent that we now consider the way in which these primary energies are exploited and perverted in our society-for long before the child enters school and continuing long after he has left it, another and more powerful educational force is at work, invading the mind and littering it with cliché, slogans and stereotyped expectations. We must never forget that the intention of the persuasion industry, manufacturing heroes and heroines, is to firmly imprint brand names on the still soft wax of the child's mind before he has even mastered words with which to reflect. As an official for a cereal product has put it, "We began to sell children our product before they could

talk. They know who the T.V. characters are long before they can say full sentences... Now they tell their mothers what to buy. Their mothers don't tell them".¹

Television is the instrument making possible such a mass-indoctrination of the young, the creation of pseudo myths and empty symbols the means. Plato's disquiet lest his guardians be "fed on images of vice like poisonous weeds, culling and cropping large quantities every day in little bits from all sides until they unconsciously collect one great mass of corruption in their souls"2 has become through the technical revolution in mass-communications, a sinister reality, particularly in America. The true symbolic heritage of nursery rhymes, myths and fairy tales, recreating the journey of life from birth to marriage to death, with its inherent conflicts between good and evil, beauty and ugliness, light and darkness, has now been largely superseded by the synthetic creations of the copywriters

and commercial entertainers. It is reported that in Los Angeles, for example, the majority of mothers of two-year-old children sing T.V. jingles and that at the age of three, nine out of ten children can identify all the main cartoon figures.³

I am anxious to stress the symbolic dimension of advertising. It is not sufficient to isolate particular advertisements from their context and to analyse them in terms of information and persuasion. It is not even enough to relate advertising to the insatiable requirements of a capitalist economy (though this, too, is important). What we must do in the first place, is to look at advertising as a symbolic system which, taken as a whole, dramatises a limited number of responses to experience and conveys, through the methods of poetry, not logic, a fairly consistent interpretation of man's nature. In its widest contours, advertising has to be interpreted as a complex counterfeit culture, generating art-forms which, for commercial reasons, spuriously answer such existential questions as Who am I? and How should I live? If we glance at the characteristic copy of most advertising we invariably encounter the sublime language of religion and of mystical and Romantic poetry. Consider the following excerpts, taken at random, from a number of advertisements:



Faberge made Love and called it Kiku.

A Colibri lighter is love.

Happiness is a cigar . . .

Xanadu is everything. And beyond everything.

Make Hovis your daily bread.

The unique sensation awakens the taste buds and prepares you for what you are about to receive.

One of the distinguishing marks of poetry and religion is that it invests the common objects of daily experience (bread, water, wine, dust, wood, sun, moon, stars) with a strange multiplicity of meanings and associations. Whereas science struggles to establish the precise sign, the mark which has a simple unambiguous reference, art and religion create the symbol, the artefact which concentrates within itself numerous and numinous feelings and meanings (or rather, hints of meaning). It is obvious

from the copy I have quoted that advertising often operates in the manner of poetry. In *A Colibri lighter is love* a general concept is nailed into a specific object in the manner of poetry where particularly and generality are fused together. In some of the other quotations (*Faberge*) language on such a vast scale, inverting and changing the meaning of words until no word possesses any settled sense, that effective resistance is rendered impossible. I would suggest that advertising seen as a totality, has similar repercussions on our culture, depleting symbolic forms so that a



made Love and called it Kiku and Make Hovis your daily bread) we hear echoes of the sublime poetry of the Authorised Version of the Bible. As S. I. Hayakawa has said "the task of the copywriter is the poeticizing of consumer goods".4 The experience of ecstasy of creating, sharing, loving, is thus constantly and artificially connected to mass-produced objects: toothpaste, soap, razor-blades, cigarettes, chocolates, cars, cosmetics: objects which, needless to say, cannot support the high associations they have been given. In this way the true language of cultural experience-particularly where it incarnates the feelings of love and tenderness, of mystery and exultation-becomes unutterably debased. Hayakawa claims that:

"The unsponsored poet of today works in a semantic environment in which almost all the poetry that ordinary people hear and read is the sponsored poetry of consumer goods. Poetic language is used so constantly and relentlessly for the purposes of salesmanship that it has become almost impossible to say anything with enthusiasm or joy or conviction without running into the danger of sounding as if you were selling something."⁴

The language of positive experience has been so used, so parodied, so abused by the official poets of industrial society that the visionary alternatives to that society have become all but unthinkable.

It is generally acknowledged that dictators, like Hitler or Stalin, pervert

people's perceptions and interpretations become narrowed down to the confines of the present "realities", the actualities which exist, and from which no one can escape. Perhaps this, indeed, is the general function of advertising; it exists, not primarily to sell specific goods, but, first and foremost, to fashion an elaborate mythology, an endless sequence of rituals, chants, icons, fables, litanies, gods, in order that the present goals of increased productivity, increased power and increased profits become inescapable and thereby perpetuate themselves for ever.



This is not, in any way, an original interpretation, disturbing as it may seem. Denis Thomas in his defence of the persuasion industry, *The Visible Persuaders*, concluded:

"Association with enjoyable sensations gives advertising its decorative glitter and its glamorous aspiration. It is even arguable that this is *its ultimate justification*, as if the economic purpose of commercial persuasion were becoming almost irrelevant compared with *its unceasing effort to gild and glorify the world around us.*"

They think we're just good friends ...but we've discovered *

The effect is shattering

What Denis Thomas fails to point out is that when persuasion becomes so diffuse, so all-pervasive, it becomes even more powerful, for it begins to appear as the essential condition for all forms of social communication. In this way, obtrusively (as on I.T.V. and in the glossy colour supplements) or unobtrusively (as with commercially sponquestionable the sored sport) assumptions of display advertising and general publicity easily become the informing notions and ruling principles of a whole people. Indeed the actual techniques of advertising, the techniques of simplification, magnification and titillation, begin to spread beyond their boundaries and enter all communications. Intellectuals become super-stars.5 Christians coin slogans like "Christ is the solution to moral pollution". Politicians exchange "package deals". Newspapers for the masses present themselves with crass jingles such as "The full of fun Sun". Poetry becomes "show-biz".6 Art turns into "Pop", and then "Op".7 Literature becomes a vehicle for exhibitionism8 (consider the title "Advertisement for Myself"). And the reviewing of books and films often deteriorates to a tasting of sweets and perversions.

Yet Thomas's actual conclusion that advertising seeks to gild and glorify the world around us confirms my argument about the overall symbolic function of advertising, as do the following claims made by powerful copywriters and salesmen:

"Our enormously productive economy... demands that we make consumption our way of life, *that we convert the buying and use of goods into rituals*, that we seek our spiritual satisfactions, our ego satisfactions, in consumption.... We need things consumed, burned up, worn out, replaced and discarded at an ever increasing rate."⁹

(My italics)

"For all its shortcomings, there must be something discerning (sic) about an industry which deploys so much energy and wit *to publicise the hopefulness of life, incorrigible faith in little things, indestructible optim*ism.¹⁰

(My italics)

"Cars are an extension of one's personality. *They are given pet names*. They represent major investments. *Cars are outward symbols of success*. There are still (in Britain) many first car people, who have only now bought their first proofs of having arrived."¹¹

We can conclude that one of the main functions of advertising is the attempt to manufacture, with the help



of poets, musicians, artists, film-makers, psychologists, behaviourists, sociologists and many others, a continuous mythology which not only elevates consumer objects into symbols but also unifies, through its innumerable creations, a society based on the need to consume, burn up, wear out, replace and discard at an ever increasing rate.

I suggested earlier that the traditional. heritage of nursery rhymes, legends and fairy stories are valuable because they "lighten the inescapable conflicts of childhood with a promise of some security, identity and integrity".12 Many of our inherited tales possess a common archetypal pattern: the hero is born, grows up, leaves his father and mother, confronts a series of temptations and ordeals, and having triumphed over them, marries the waiting princess. Such stories clearly symbolise the path of Everyman, etching in bold lines the gradual and ideal journey from infant dependence to maturity. Through the heroes and heroines, children may dimly come to feel that there is a disflicts but also reconciliations, and that always at the centre of the design there lies the true self, the promise of identity. Coleridge claimed that through the early reading of fairy tales his mind "had been habituated to the vast" and that there was "no other way of giving the mind a love of the Great and the Whole".13 It is not, then, surprising that the false mythologists of the consumer society, realising the educative powers of the archetypal story, have been anxious to disseminate their own fabricated rhymes and legends.

"Children love their heroes and if a hero says 'eat Wheaties' they will for years and years and years. To be able to capitalize on a fad, a company has to be able to move in and out fast."¹⁴

As we have seen, one of the declared intentions is to implant brand names on the child's mind before he can think, but there is another aim, less obvious and perhaps not wholly conscious, which is constantly to symbolise a narrow range of sensational responses to the world which are wholly in accord with the manic goals of endless consumption. Here the values and aspirations of traditional culture, as embodied in myth and fairy tale, the need for integrity, courage, independence, loyalty, love are stood on their head. The artificially engendered myths for children urge, more often than not, greed, and violence. conceit selfishness, American salesman proclaims:

"If you want to create your own hard-hitting spokesman to children, the most effective is The Super-heromiracle worker... The character would be adventurous. And he should be on the right side of the law. A child must be able to mimic his hero, whether he is James Bond, Superman or Dick Tracey; to be able to fight and shoot to kill without punishment or guilt feelings."¹⁵

In other words, children are being urged to identify with heroes who symbolise pathological forms of behaviour. The requirement that the "miracle worker" should be both on the right side of the law and yet be able to murder without guilt feelings is distinctly schizoid. It would seem that the young are growing up with heroes or heroines representing infantile levels of response, levels of response before an awareness of the other and a concern for the other has developed. The recent James Bond cult in this country would confirm this analysis-for James Bond celebrates a regression to experience without responsibility, concern or guilt, and sanctifies an identity utterly dependent on consumer artefacts and what, through the copywriters, they have come to symbolise. In this synthetic phantasy, written for success and money, the objects of advertising (cars, jewels, alcohol, clothes, gadgets of all kind, gold) and their pseudo-symbolic references (sexual prowess, speed, mobility, violence, power) interlock. In James Bond is to be found no journey from infancy to maturity, but rather the closed ward of the mentally sick.16 That such a figure became a potent image for selling toys, clothes, cars, cosmetics, and a torrent of consumer trivia, only points us, once again, to the warped phantasies which are manipulated to secure the goal of industrial man.

Man, in industrial society, becomes externalised, becomes preoccupied with objects, machines, techniques—advertising elevates this preoccupation into a theology and a ritual. Children, at a very early age, are compelled to imagine and dream of life as the accumulation of fashionable products. Even dolls are fashioned in the prevailing image:

"She's a really with-it, teenage doll always up with the latest fashions, not only in styles of dress but also in fashion accessories and hairstyles. Barbie has a costume for every occasion. You choose it—you dress her. So make friends with Barbie now."¹⁷

In fact, "the world of Barbie", to use

Trust * * to taste good

image of female sexuality as projected by advertising and the commercial pulp of teenage comics. The early play of the child must fit the demands of machine culture. So much is provided in the way of visual form, literal detail and accompanying accessories that very little space remains in which the child can release his own phantasies and through projecting them onto his play objects, give them life. In the last decade, children's toys have been designed to a progressively more realistic style. (Toy guns, for example, have been recently used in "real" hold-ups.) It would seem more than likely that such toys, relating directly to the prefabricated images of mass-entertainment, instead of fostering that innate power to create phantasy from within, enforce a repetition of those stereotyped actions already invented by the commercial manipulators. Such toys encourage a conformist mode of play, play in which the dominant values of the external world are introjected and repeated while the powers to initiate and invent from within outwards atrophy. In this way, the actual preoccupations of the adult world, as depicted by copywriters and entertainers, become those of the child. The Advisory Centre for Education, examining hundreds of

Our * are worth a fortune in flavour

the phrase of the manufacturers, includes not only hairstyles and dresses, but hundreds of items, from "Queen beds" to racing cars, from books to "dream houses". Mattels profess to work on the principle of Gillette razorblades: "you know, first get them sold on the basic unit, then keep on selling them the accessories."¹⁸

The actual shape of the doll, with fully developed breasts but attenuated limbs, with gyrating hips, with glossy hair, long eye-lashes and rose-bud lips, derives from and further reinforces the letters written to Father Christmas, concluded that:

"The influence of television selling is rather disturbing. Little girls seem particularly vulnerable. It is also troubling to see six-year-old girls writing to Father Christmas for 'sexy boots' or pop records. A lot of girls are asking for 'pureplume' (perfume?) or the latest face powder, and a teenage concern with body odour seems to have been successfully planted on little girls by mass advertising." It would, I am sure, be possible to document more fully the influence of advertising on children. What I have been anxious to stress is the symbolic dimension of advertising and the way in which the cultural heritage of true myth and true poetry is being steadily eroded. I have also been anxious to draw attention to the general values and assumptions promoted by advertising and commercial propaganda. Here I find myself largely in agreement with Joan and Andrew Robertson who have written:

"The communicators are a competitive segment of modern industrial society, and right out in front are the trendsetters with their over anxiety to shock, jolt, upset or, in their own carefully calculated word, stimulate. But what do they stimulate in the young? Kindness, generosity, tolerance, sympathy, gentleness? Hardly. These would rate low in the television scale of values as weaknesses.

The qualities most prized are toughness, self-love (as opposed to selfrespect), conceit, arrogance, philistinism and anger ...¹⁹

The comment would seem to apply particularly to the advertisements and entertainment directed at children. Elsewhere, as I have indicated, we often find a spurious appeal to creative emotions, love, sympathy and tenderness. It would seem to me that both appeals, whether to the low or the high, are equally dangerous, for while one urges into action crude and destructive forms of behaviour, the other dilutes, parodies and destroys the deeper aspirations of man.

I have presented in broad outline the case against advertising conceived as a symbolic system. However, there is nothing particularly new in the general drift of my argument. The earliest movements towards an imaginative form of English teaching were concerned to restrict questionable adult influences on the child. In 1920, Dorothy Owen wrote:

"The sweeping clear their minds of all prejudice, second-hand opinions, preconceived notions, that is the hard task... Before ever we can get children to express themselves we must sweep their minds clear, remove the darkened spectacles, and turn their eyes toward the direct vision. Once they are freed from the restraint of opinion they can learn to tell us what they see."²⁰

For Dorothy Owen, the child, at the beginning of the 20th Century, had not the realisation of what its experiences were. As it grew, so the garb of preconceived opinion was tightly wound round its senses. Dorothy Owen doesn't directly relate this dimming of individual experience to the growing network of mass communications, but in 1933 Denys Thompson and F. R. Leavis made the connection explicit:

"Those who in school are offered (perhaps) the beginnings of education in taste are exposed, out of school, to the competing exploitation of the cheapest emotional responses; films, newspapers, publicity in all its forms, commercially-catered fiction, all offer satisfaction at the lowest level, and inculcate the choosing of the most immediate pleasure, got with the least effort . . .

The school-training of literary taste does indeed look a forlorn enterprise."²¹

Nearly 40 years later, Richard Hoggart in his Reith Lectures (1971) was to make a similar condemnation:

"You look over a sad and virtually world-wide panorama of the media in chains: in chains to the fooling and narrowing purposes of selling: in chains to the narrowing and stifling purposes of the national powers-thatbe and their insistent fixed picture of what their culture is and shall be."

Even more recently, in The Imagery of Power (1972), Fred Inglis has shown how the counterfeit symbolic system of advertising exists to hide the latent contradiction between mass-production and growth economics, for, in a society, where the actual necessities of life can be provided easily for all, there exists a historically unique opportunity to create the sane society, where the creative, aesthetic and philosophical energies of man could be widely and harmoniously cultivated. In this light, advertising can be understood as a gigantic endeavour to close the circle against the pressing alternatives for man's development.

But how, in practical terms, can the English teacher help to break open the circle so that creative vision and intellectual speculation can assert their liberating influence on life? I would suggest he has the four following responsibilities:

- 1. To create, in contrast, a truly creative and honest use of language and symbol.
- 2. To encourage his pupils, through the proper study of literature, to become aware of cultural and moral ideals.
- To consider ways in which the school could be transformed into a cultural centre for the surrounding community.
- 4. To foster in his pupils a critical attitude toward publicity, advertising and propaganda.

In our society these are exacting responsibilities. Many adolescents are so identified with the images cast by the media, that they positively do not wish to see that they are being cynically manipulated, or, if they do see, do not care. Yet their responses only italicise our responsibilities.

NOTES

- 1. An official for an American Cereal Product quoted in Ron Goulart's *The* Assault on Childhood (Gollancz).
- 2. Plato: The Republic.
- 3. See article on T.V. Ads. in *T.E.S.* (July 1973). In the same article Roland Kransen points out that in rural Pennsylvania, pre-schoolers watch television for an average of 30 hours a week. *IBA Notes* (March 1973) claims that in Britain "the average home in this country watches ITV for more than three hours a day, and BBC for more than two hours".
- 4. S. I. Hayakawa in Language in Thought and Action (George Allen & Unwin).
- 5. The heading to a major article in the *Times* Educational Supplement was recently headed "Intellectual Superstar".
- 6. The slogan of Adrien Henri and Co., on a BBC Television poetry programme.
- 7. Herbert Read writes: "The so-called movements—Action Painting in the United States, Pop Art and Op Art have become pseudo-movements, the creation of journalists. See *The Black Rainbow* (H.E.B.)
- 8. Title of the novel by Norman Mailer.
- 9. Victor Lebow in The Journal of Retailing quoted in Vance Packard's *The Hidden Persuaders.*
- 10. Philip Stobo: Advertising Copywriting as a Career.
- 11, Ernest Dichter in *Harvard Business Review*. It is interesting to notice the way in which through the phrase "many first car people" a consumer object is transformed into an essential attribute of personality.

- 12. Erik Erikson: Childhood and Society (Penguin).
- S. T. Coleridge, letter to Thomas Poole dated October 16th 1797.
- 14. Commercial agent quoted in The Assault on the Child.
- 15. Quoted in William Mellody's Children's T.V. (Yale University Press). Obviously the situation is worse in America than at present in England but as Stuart Hood pointed out in a review of Children's T.V. "Products produced in the States to achieve acculturation to a society where one can 'shoot to kill without punishment or guilt feelings', are brought and shown on our screens. Nobody...can fail to wonder what effect they have on the phantasies of the child audience and on their images of life". (Times Educational Supplement: 25.1.74.)
- 16. For a lengthy psycho-analytic study of the James Bond cult see David Holbrook's *The Masks of Hate* (Pergamon).
- 17. Advertisement for Barbie doll in popular children's comic.
- 18. A Barbie "public-relations" man.
- 19. Joan and Andrew Robertson in their Introduction to The Assault on Childhood.
- 20. Dorothy Owen, The Child Vision (Manchester University Press, 1920).
- 21. F. R. Leavis & Denys Thompson Culture and Environment (Chatto & Windus).

What is Ecology?

D. F. Owen

Ecology is concerned with exponential growth, the control of population size, and the structure of communities and ecosystems. The author of this book begins with familiar animals, plants, and situations-thrushes and earthworms on the lawn, and herons and pike in the river-and describes with great clarity (and often with humour) how they live and why they die. He goes on to consider man as a part of nature and explains how ecology affects us, and our supplies of food, oil, and other raw materials. This book will guide readers to think as ecologists and to make sensible predictions about the future. Illustrated £2.75 paper covers 95p OPUS

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Modern sugar factories and mechanical farming aids have tended to obscure the field importance of honey and bumblebees in propagating essential food plants. Added neglect comes from the official level where beekeeping is regarded as a Cinderella activity. But bread and butter issues do enter the picture in terms of good flower, fruit, vegetable and crop yields, which cannot occur without pollination.

Long ago Charles Darwin had clearly shown the close relationship existing between bees and the fertilisation of red clover. He demonstrated how 100 heads of red clover produced 2,700 seeds when bees were available, but by shutting the same number of flower heads away from the insects Darwin found that the plants gave no seeds. Although honey or hive bees and bumble-bees are really complementary workers in the field, various types among the Bombus group have longer tongues than the former. For this reason bumble-bees are more efficient red clover pollinators and in a similar way they can pollinate other flower species which have very long corolla tubes. Hive bees do of course also help to pollinate red clover, but studies show that regular flower visits will not occur unless the nectar level in the corolla tubes is high enough for shorter tongues to do their work.

Even with modern plant-breeding methods for the propagation of better vegetable strains all has not been well without our. useful bees. This was evident to scientists in 1971, whose botanical work at the National Vegetable Research Station in Warwickshire had been hampered by the refusal of bees to cross-pollinate a new type of brussels sprout. Hybrid seeds for the new variety could not be produced despite the fact that it was known to have a 50 per cent higher crop yield than other varieties.

In a more direct way hive bees since prehistoric times have been providing man with health-giving honey supplies. The food of the gods is how the ancient Greeks described honey, and for similar reasons Palestine had been known as a land which flowed with milk and honey. Down the centuries men saw that their fields, gardens and orchards produced rich crop yields when bees were at work, significant were the comments of the early Phoenician traders who called Britain the Isle of Honey.

In connection with farming and gardening matters Aristotle closely studied the foraging habits of hive bees, and he rightly observed that over lengthy periods the insects kept visiting one particular flower species. Such a habit helps the workers to conserve time and energy, while making the most of available nectar and pollen supplies.

Similar observations in present times have revealed that nectar from more than 2,000 flowers is required for making a tablespoonful of honey. To produce 11b. of honey the bees would need to collect 40,000 loads of nectar, and this is equivalent to flying twice round the world. Little wonder then that a single hive contains 50,000 or more bees for doing the job.

Unlike the hive bee our 25 species of bumble-bees are not great honey producers, nevertheless they do provide small amounts of honey for the needs of their colonies. Nectar as the basic substance of honey contains a complex mixture of sugars including sucrose, glucose and fructose. These carbohydrates aided by the protein in pollen mixtures are necessary for providing the worker bees with a high energy output when building up their colonies.

The energy rate here explains why

honey is useful to us from the food and medical viewpoints. It is ironic that toxic chemicals are killing off innumerable hive and bumble-bees at a time when medical men and scientists across the world are re-discovering the therapeutic value of honey, and the clinical cures which can result from using bee venom.

Regarding his report on "Honey as Surgical Dressing" Dr Michael Bulman, the Norwich surgeon has stated that he has every reason to believe that this very simple substance provides one answer to the problem of dealing with many infected wounds. Neat honey in the operating room provides a nonirritating, non-toxic, self sterile and potent germ killer which can destroy numerous types of bacteria within a matter of hours.

The demand for honey throws into focus the urgent need for protecting all our bee species whether of the hive or bumble variety. As yet much more ecological information is required about bees in general regarding their field habits. Fortunately the Bee Research Association headed by Dr. Eva Crane is at present engaged on a mapping programme which will show the distribution patterns of bumble-bees throughout England, Scotland, Ireland and Wales.

Such research can also be expected to give us a greater insight into the formation of breeding colonies among our 25 bumble-bee species belonging to the genus Bombus. Some of these will begin their colonies in the old runs made by field mice or voles along earth banks, while others select the bottoms of hedgerows. But the wholesale destruction of hedgerows in recent years has reduced the number of bumble-bees in various places.

Affected also are the other British bee species which do not form social colonies like the Bombus group, but live as solitary insects. Altogether we have 240 bee species in the British Isles with the majority of these being classed as non-social. Most however, are useful pollinators which need the many nectarbearing plants found in the shelter of hedgerows.

Such cover can provide necessary wind shields and sun traps, especially for those early spring bee species prominent among which is Bombus pratorum. These will appear at the beginning of March or April, and the species mentioned is a darkish coloured insect distinguished by a red tip on its abdomen. But all our bees need protection at a time when hedgerows are being cut down at a rate of between 5,000 and 6,000 miles each year.

Important ecologically is the fact that bumble-bees are found in much smaller family units than hive bees (Apis Mellifica). Some nests may contain less than 100 specimens although much larger units have as many as 400 insects. But compare such with a thriving hive bee colony where members can number between 50,000 and 80,000 individuals.

Other differences between the two groups relate to foraging habits. Bumble-bees score over their hive-bred cousins by starting work much earlier in the day, and by flying under adverse weather conditions. An early riser is Bombus agrorum, a common, brownish orange coloured bee which will be working long after the hive bee has retired for its night's rest. Unlike the latter colder conditions will not keep bumble-bees at home.

The importance of pollination has been recognised by the Monk's Wood Experimental Station, Abbot's Ripton, Huntingdonshire where Dr Frank Perring has begun a 10-year research project concerning the effects of pesticides and weed killers on honey and bumble-bees. He notes that each year many thousands of honey bees are exterminated by aerial spraying methods as a result of wind-blown insecticides. The damage here can cause havoc on tracts of ground more than a mile apart.

As early as 1964 Dr Crane of the Bee Research Association had recorded a drastic decline in a number of beekeepers in England and Wales. She found that during 1962 both countries supported a total number of 47,923 bee-keepers who tended 228,496 colonies, but by 1964 there were 3,500 fewer keepers, and the countryside had lost 92,000 colonies. Present estimates have put the reduction rate well below these figures, and there is no sign that the downward spiral has been halted. At this rate ecology is the watchword, for in 1970 the Lincolnshire Bee Association found that its 700 members had lost four tons of honey because of spray damage. Admittedly the Advisory Committee on Pesticides has been responsible for restricting the use of some organochlorine insecticides under the Pesticides Safety Precautions Scheme, but concerning bees, better protection laws should be introduced.

Even with restrictive measures on the use of D.D.T. dieldrin, aldrin, endrin, chlordane and endosulfan there are many other pesticides mixtures which are listed as being harmful to pollinating insects. Most of these chemicals belong to the organochlorine and organophosphorous groups, with the former including D.D.T. which is still widely applied to agricultural land in the form of toxic dusts and sprays.

Lead arsenate is another notable beekilling agent, especially when it is used on fruit trees. As a "stomach poison" arsenic has caused widespread destruction among bees in Canada and the United States. It was first produced in 1892 as an American protection shield against the immigrant European gypsy moth, but by 1927 these insects were becoming immune to this pesticide because of its use under intensive fruit cultivation systems.

More than 30 years ago bee-keepers complained about lead arsenate, but despite these complaints the poison is still officially recorded as a useful agricultural pesticide. On the conservation front however, severe restrictions are required regarding the use of pesticides and weed killers. Moreover, if these were imposed, there are hopes that other new developments might give added protection to bees.

Encouragement here comes from experiments involving the addition of repellent substances to toxic sprays. It is known that many chemicals will act as repellents, thus preventing bees from visiting contaminated flowers. More than 200 substances of a similar nature have been tested by scientists from the U.S. Department of Agriculture and the University of Arizona.

Included among the most potent repellents they have found a variety of acid anhydrides and amines, but only a few compounds in the alcohol and fatty acid groups proved to be good attracting agents. In Britain repellent tests have revealed that lime sulphur, creosote, acetic acid and phenol are quite effective. Obviously the field use of these substances will be limited, for they only offer a partial answer to the pesticide problem.

Naturalists recognise that repellents especially if used indiscriminately could remain rather unsuccessful if alternative food sources are not at hand. Under such conditions the insects might be forced to go without proper nourishment. But even with numerous food sources available the careless handling of repellents could possibly help to eliminate our bumble-bee populations by disrupting natural foraging habits, and upsetting their breeding patterns.

For example, observations show that the insects apparently leave scent marks on particular plants as indicators to other members that specific food sources have become exhausted. It is



also known that various bumble-bee species have a habit of marking leaves and twigs with scented materials which act as sexual signals to the females. By this arrangement certain territories are set apart to which the queens are attracted and therein mating takes place.

Dr H. Calam of the Rothamsted Experimental Station has found that scented materials are produced by bumble-bee species including the Red Shanked Carder Bee, Common Carder Bee, Stone Bumble-Bee, the Early Nesting Bumble-Bee and the Small These sexual Bumble-Bee. Earth attractants are produced by special head glands, and according to German scientists scented materials are likewise used by various bee species in Brazil. But there the drones do not make the scent from their own bodies, but collect it from orchids and other plants.

Enough has been said about hive and bumble-bees to show how necessary it is to protect them against human interference and toxic chemicals. An obvious way of reducing their death rate would be for gardeners and farmers to refrain from indulging in spraying during blossom time. Equally necessary would be the choosing of calm weather conditions rather than windy periods when poisonous chemicals could contaminate many flowers over a wide area.

The setting aside of rough grassy places with earth banks, undergrowth, old walls, hedgerows, weeds and nettle patches etc. would help to provide nesting places for various bee species. Farmers and gardeners alike could ensure that uncultivated areas are left for this purpose, while wild flowers must be plentiful along field boundaries and roadside verges. Lime, sycamore, chestnut, hazel, elder and hawthorn trees are also important nectar sources.

Even small city gardens with wall flowers or fuchsia will provide a useful food supply for the bees, useful too are window boxes or other containers. In the long run of course it is a case of abandoning the blatant use of chemical pesticides in favour of the more subtle and less destructive and ultimately more effective control that would become operative were the vast expanses of monoculture being farmed today to be returned to small mixed units with far more stable natural ecosystems. Only then will the vital links which exist between men, bees and plants, be safely re-established.



The subsistence farmer or smallholder should regard the keeping of honey-bees as a cornerstone of his economy.

His self-sufficiency will not be complete until he produces his own sweetening agent, but far more important even than the honey he gets for his household will be the enormous benefit derived by his fruit crops and his vegetables from the presence of a few hives on his farm. As we have seen from the previous article Bees as Pollinators there is no doubt about the role of bees as pollinators and in the early spring, especially, the honey-bee is of unique value because whereas other pollinating insects, such as the bumble-bee and the wasp, die off in the autumn and only the queen survives the winter months, in the case of the honey bee the social unit or colony exists throughout the winter. When ambient air temperature falls to about 48°F, that within the hive is about 57°F and the bees begin to form a cluster on the combs-moving across the combs very slowly and consuming enough honey to sustain life. In colder weather the cluster packs tighter to reduce radiation. By the end of January, in a well found hive, only about 10lbs of honey will have been consumed, but in early February much more is eaten. The temperature at the centre of the cluster rises to 90°F and the queen begins to lay again. When with the return of spring, the temperature rises to 50°F in the shade, the cluster will have expanded to the limits of the hive and flights will occur in search of food.

Subsistence beekeeping implies of course the production of honey without recourse to artificial feeding, except in dire emergency. Small beekeepers are generally generous to their stock and heavily critical of those who rob their bees of their natural food supplies, but most books on the subject do tend to take it for granted that some artificial sugar-syrup will be fed. Wild bees in their natural state, with admirable foresight and prudence, store, in a good year, far more than one winter's requirements, so that they have reserves to fall back on in a bad winter. The subsistence beekeeper will do the same. Some honey should be reserved so



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Seehive Works Wragby Lincoln LN3 5LA Telephone Wragby 555 (STD Code 067 34) that if there are signs of his bees running through their own stores at the end of the winter, or between one honey flow and the next, he will be able to replenish their stores from his own. There are seasonal differences every year, and sometimes because of drought or excessively long periods of bad weather, there may be hungry gaps in the late spring. Conversely just as the honey-bees will visit early flowers before other pollinators are about, so will they continue to work wherever there is a nectar flow long after the wasps and bumble-bees have died off. In the mild winter of 1973 the late flowering ivy in the west country produced a nectar flow that had the honey-bees working away in early November as though it was still midsummer.

A hundred years ago and more beekeepers kept their bees in straw skeps, which had changed little in centuries of beekeeping. The skeps were home-made, very light, and easy to carry, so that the bees could be moved from orchard to heathland as one honey flow ended and another began. However, there were difficulties with these simple hives; it was impossible to inspect the interiors to see what was going on and the beekeeper could not control the colonies in any way. Furthermore he could not extract the honeycomb without first killing the bees. For this reason the normal practice was to kill off the inhabitants of half the hives at the end of the season, when the beekeeper took all the honey stored by the slaughtered bees, while the bees in the remaining hives were left undisturbed, to feed during the winter on their own stores.

Today these attractive straw skeps are seldom seen, although they can still be used in conjunction with modern hives, for collecting swarms. In practice most beekeepers now use one of the standard types of beehives, based on a prototype produced just over a hundred years ago by a Rev. Langstroth, who revolutionalised beekeeping when he invented the movable frame hive. based on his own observation that in every natural bees' nest there was a space of between a quarter and threeeighths of an inch between the combs. He found that if he provided his bees with wooden frames hung horizontally in a box, and with this "bee-space" between each, the bees would use comb on the wooden frames and would respect the space. Using the

frame type house the modern beekeeper can inspect his hives and keep watch for signs of food shortage. He can observe what is going on in the brood nest where the queen lays her eggs and the larvae are hatched, and he can lift out the frames for the extraction of honey without disturbing the bees. Nor are bees now deprived of all the wax they have produced, and honey in comb sections is an extravagant luxury which the subsistence beekeeper will be unlikely to indulge. With the use of an extractor (usually hired, shared or borrowed) the honey can be removed from the frames by centrifugal force, and the wax comb is then returned to the bees for further use. In the event of the need for new wax this can be bought in sheets of pure beeswax, called foundation.

In spite of his limited knowledge of the life cycle of bees the early beekeeper had one great advantage over the beekeepers of today, because the natural vegetation was richer and more varied. Today the bee is in competition with man. Vast stands of cereal crops are a poor source of nectar, and besides the spraying of insecticides there is the deleterious effect of selective weed killing and the eradication of hedgerows and other forage. The siting of a new colony of bees is therefore a matter for care and thought. Ideally the hives should be in a warm sheltered position close to a wide variety of nectar producing plants. Fruit trees, sycamore and lime trees, are excellent. The more showy garden flowers (roses and dahlias among them) are of little value, but herbs such as mint, thyme and basil are useful, as are lavender and rosemary and many of the old cottage garden forget-me-nots, flowers-marigolds, canterbury bells, mignonette and so on. Flowering shrubs are useful, especially honevsuckle, as well as heather and

gorse. Less well known but easy to grow and of interest to the subsistence farmer because of its use as a poultry food, is buckwheat.

The number of colonies that can be kept will thus depend on the forage potential of the area and also to some extent on the presence of other beekeepers in the neighbourhood. A small apiary of some 15 hives will work over an area of roughly two square miles. But the beginner would in any case be wise to find out what is going on in his immediate vicinity before setting up his apiary, remembering that although they can fly some miles to collect nectar and pollen, the energy of the bees will be dissipated if they have to do so.

A start can be made in several ways. An unwanted swarm may be bought from an established beekeeper, and this. is a cheap and good beginning if the beekeeper is known and is able to assure the beginner that there is a young queen present. A swarm from an unknown source is less satisfactory. The queen may be old or infertile, in which case the workers will be no good as. honey producers. There is an old saying: "A swarm in May is worth a field of hay", which possibly refers to the fact that an early swarm with a young queen will be able to establish itself and produce at least enough honey to supply its own needs through the following winter and in a good season some surplus for the beekeeper. Perhaps the saying meant more to the skep beekeeper who had killed off half his stock and wanted to see new colonies established as early in the year as possible. Today swarming is discouraged on the whole since it decreases the number of bees who are actively engaged in gathering nectar and making honey. Alternatively a start can be made by buying a small nucleus stock with a young queen and a few

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frames. Such stock will produce very little honey in its first season and will probably need to be given food during the first winter, but the beekeeper will have the great satisfaction of building up his colony from small beginnings. An "artificial swarm" or "package" can be bought by post from a bee supplier; this is recommended in the Ministry of Agriculture, Fisheries and Food booklet (see below) for replenishing stock in an established apiary, but is not recommended for beginners. No reason for this is given. Probably the easiest way to start is to buy an established stock on ten brood frames. This requires the biggest capital outlay, but is the surest way of obtaining honey in the first year. On the other hand it is unlikely that an absolute beginner would be able to manage a colony unaided, and for anyone new to the whole thing it would seem much wiser to start in a small way and be prepared to wait for the second season, by which time his own knowledge and understanding of his bees will have increased, before handling a full hive. In any case



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Bee Research Association Hill House, Chalfont St. Peter Gerrards Cross, Bucks. the would-be beekeeper is strongly advised to make his first steps resolutely in the direction of the county branch of the British Beekeepers' Association, who will give him advice appropriate to the area in which he proposes to set up his apiary.

A colony consists of a queen, two or three hundred drones-the male bees whose only function is to mate with the queen-and thousands of workers whose duties include feeding, nursing and guarding the queen and the larvae, cleaning the brood cells and collecting nectar and pollen to make honey and to feed the young bees. The queen's only task is to lay eggs, from which come the young stock that constantly replenish the colony. In a good year one colony can produce upwards of 100lbs of honey (much higher yields have been recorded) but a realistic average yield in a very good area is 70 to 80 lbs per hive per year. Of this the colony will need around 45lbs for winter feed, but this figure too will vary according to the length of the winter and the strength of the colony. The subsistence beekeeper, like his bees, will have good years and bad ones. He might aim at an average surplus of 30lbs of honey per hive per year, sometimes he will take more and sometimes he will have to be content to know that the bees have only made enough for themselves, but even in a bad year, when there is no surplus for the beekeper, he must remember the inestimable benefits his bees have conferred on his holding, just by being there.

Further reading:

Beekeeping. Bulletin 9. Ministry of Agriculture, Fisheries and Food. H.M.S.O.

The Complete Guide to Beekeeping. Roger Morse. Pelham Books.

Beekeeping. Lt.-Col. A. Norman Schofield, Teach Yourself books.

Plants and Beekeeping. F. N. Howes. Faber & Faber.

Honey-Bees and their Management. S. B. Whitehead. Faber & Faber.

Leaflets from the BEE RESEARCH ASSOCIATION Ltd., Woodside House, Chalfont Heights, Gerrards Cross, Bucks.

For General Information and advice about local branches write to: The General Secretary, B.B.K.A., 55 Chipstead Lane, Riverhead, Sevenoaks, Kent.

LOW ENERGY AREA SYSTEMS

by ANDREW MACKILLOP

Energy has come to occupy a critical role in the world economy, simply because it is now recognised as the key to maintenance of cities and industry. For historical reasons the supply of energy is highly centralised, but rising real costs, strategic considerations, and the need to limit energy-related environment damage are focusing attention on low-energy technology, alternative energy sources, and thermal conservation. All of these factors, and others, point to a need for decentralised-local-area-energy supply arrangements, wholly unlike the present structures used to service our needs for energy.

In this introduction to the developing concept of decentralised energy systems we consider some of the general principles. In future articles in this series consideration will be given to specific examples in national and regional contexts.

Energy, Quality and Type

The end of cheap energy, and the view of our environment as a "free disposal service" have made consumers need to consider not only the quantity they use, but also the type and quality (although this is still screened by economic factors).

| Energy Quality | Energy Type |
|-----------------------|-------------|
| high grade-high | solar |
| energy | light |
| waster of a start and | electricity |
| | mechanical |
| | chemical |
| low grade-low | thermal |
| energy | sound |

An easy example is electricity. This is extremely centralised in production but is used at the other extreme of dispersal. It is also a very high-grade form of energy. As it is near the grade of fusion (the highest) its efficient production via thermal systems requires very high temperature. The compromise of a few hundred degrees centigrade in power station boilers means that a large part of the initial chemical (fuel) energy will never be converted to electricity.

Before October 1973 electricity was

already three times the pence-per-kilo-Watt/hour level of oil or gas. When they quadrupled in price electricity also had to rise. Since the power station cost of coal bears no relation to that paid by domestic consumers (it is so much lower!) and coal accounts for about 60 per cent of our electricity, prices have risen "only" by 40 per cent to 70 per cent. It is no longer easy to have electric central heating. Increases in "White Meter" rates have been highest, rises that seem not to relate to Government-backed and pay-rise price "norms".

On the other hand, lower-grade energy sources such as gas, and central heating oil, are still cheaper to use, despite large increases. Since there has been an absolute rise in energy costs, the relative differences—which are controlled by energy quality and type —will begin to exert more force.

Forward planning of UK national energy supply is more and more based on two panaceas: North Sea and nuclear energy. One should read "Offer Closes 1991", and the other "Beware -Extreme Danger". Official hopes are that these cheap energy sources can arrest energy-determined and therefore inevitable cultural and social change. But more and more the economic force of change will be very much influenced by energy costs. Minimising these will need much greater energy efficiency, especially if we charge ourselves for damage we do to the present, and therefore infinite, environment. For example, by eliminating a species, we can cause a spiral of unfavourable change to occur in future ecosystems. A less esoteric example is: how do we cost the inevitable oil damage to N. Atlantic fish populations?

Environmental considerations are no longer the sole area of effete conservationists or the deranged because of mounting pressures on our most basic energy need-food production. Energy survey and analysis, which will become more and more important, has already been applied to food production. The approach has emerged, without real Government support, since about 1969 and is now becoming significant in enlightened thinking on energy matters. Always the basic conclusions are that, for efficiency, the type of energy used to service a need must be matched to the energy type of the need.

New Energy Technology

Much of the new technology and

thermal conservation methods that consumer increasingly reach the through the media are related to domestic energy consumption. This is not an accident. Domestic users require only small relative amounts of highgrade energy; on the other hand industries often need large amounts of electrical and mechanical energy. Wind and water power are relatively lowgrade mechanical; and by the time solar energy reaches the roof it is very expensive to use except for thermal purposes. Therefore the available supply of alternative energy sources well matches the type of energy needed to meet demands of domestic consumers.

Further, measures such as low-tariff electricity ("White Meter") in off-peak periods only, have already made consumers prepared to group their demand for an intermittent supply. This situation is much stronger with alternative energy sources—for example windpower, where ideally the consumer would use the source only during windy time periods. The historical antecedents are strong, with tide and windmill working being greatly controlled by timing of supply.

Regional Variation

The factor of regional variation in supply of conventional and alternative energy sources is of equal basic importance. "Carrying coal to Newcastle" implies un-needed additional energy costs. As energy efficiency becomes vital it will reduce the possibility for such energy diseconomics, and make local-area energy supplies of much greater importance, especially to domestic users. Interestingly, this is equally applicable to transport nets where route minimisation is a strong principle. Before low cost transport (due to cheap energy) regional foci or centres much more precisely serviced local area needs. The need for regional self-sufficiency was satisfied by decentralisation of need-servicing activity. As an economic correlate of thermal conservation, needs were simplified. Culturally, this was in no way a bad thing.

Because of electricity's artificial cheapness, which is now being fast eroded, a national-scale grid network has been economically justified. Possibly more important than the high capital cost that demands recoupment, is that grids—for some reason—have entered the confused bag of "progress symbols". Even diffuse solar energy is proposed by some as a means to supply grid electricity. There is a very small case for converting solar energy to electricity in deserts and at high altitudes, but even there very large-area and high cost conversion equipment is needed. The most extreme of the "instant megaWatt" philosophy in solar energy research is the orbital solar station. To supply one large city's electricity would need a collector area of about 25 sq. miles, and a microwave power link to earth at dozens of times the present economic-technological power limit.

Yet this concept has been heavily funded in the US and possibly USSR. The level of funding is much larger than all current domestic-application solar energy research. Obviously, one of the strongest reasons for this peculiar mismatching of priorities is that converting solar energy to electricity may be inefficient, dangerous or even impossible, but it does offer hope for maintaining centralised electricity networks. In all cost-conscious use of new energy sources (wind, solar, etc) it is very significant that reducing the conversion point to the community or individual level is a recurrent theme.

In the 1950s there was much useful R&D effort in Europe on windmills for generating electricity, conducted by the Electrical Research Association (UK) and others. But national-level funding in the US on Putman's 1250kW "Grandpa's Knob" mill in Vermont, and the French-English Andreau mill (ca 200kW) set out to achieve the difficult or impossible. The larger the mill blade the more it is subjected to variation in wind force (which varies as windspeed cubed). Making the blade and power transfer systems sufficiently resilient was expensive, and both of the above mills were self-destroyed within 15 months of installation. Anyone amused by Victorian mechanistic fantasy will see this as the dominant basis for T. H. Percy's study in 1945 for a US national network, of giant mills strung together with grids.

Ironically, a much more cost-effective wind-electricity system—operating at local levels—had existed in parts of rural Denmark prior to 1939. This was based on Lykegaard mills, which were essentially rationalised-traditional sail mills, running dynamos of about 25-50kW output. There is no reason why

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such equipment should not be resuscitated, and offers very interesting R&D material—once we have our priorities straight.

Hydropower has been the most centralised renewable energy source, once more to feed national (and even international) power grids. As we now very amply know, big dams do a lot of environment damage. In the case of ones like Aswan and Cabora Bassa they also do great cultural and social damage. If we wish to maximise our use of waterpower, however, big dams are not the answer. Similarly to making best use of wind and solar energy, decentralisation of conversion points will optimise our use of waterpower, while minimising environment damage.

Some Conclusions

National-scale grids, especially for supplying high-grade electricity, will become more and more difficult to maintain. on economic grounds. Domestic and local-area scale methods for servicing energy needs will become more important. Greatest use of new energy sources with least environment damage calls for decentralised supply systems. The economic change to this is at present masked by the very high capital investment in grids, and fuel costs that are still, despite the last six months, low. Decentralised population groups, the best suited to using new energy technology, are also best able to become more self-sufficient in food, and there can be very little doubt that food prices will continue to rise rapidly. Since food production at highest energy efficiency is labour-intensive this requires much higher farm populations, garden co-ops, and other localised food production methods.

Reorganising power supplies on a local area basis requires a different methodology from that presently used. In future articles in this series we will examine specific examples—such as localised waterpower. To a large extent there is a poor matching of available renewable-source power supplies and population clusters but this serves only to show how much we have ignored the opportunities when planning in the "eternal present" of cheap fossil fuels, that is now firmly over.

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Green Belt around the Desert

by WENDY CAMPBELL-PURDIE



An area of desert 1965

Deserts *can* blossom! But this is difficult to believe without concrete evidence. The people who live on the fringe of the desert tend to be resigned, or terrified of what it might do. Every two years the Sahara lays waste an area larger than the State of Connecticut. Wells are silted up and the arable land is eroded.

The desert can be halted. It can also be pushed back. Between 1965 and 1970, Wendy Campbell-Purdie (the director), working with a team of Algerians in Bou Saada, reclaimed two hundred and sixty acres of barren Sahara plain by planting a hundred and thirty thousand acacia and eucalyptus forest trees. As these grew they gave progressive shelter from sandstorms and increased surface humidity. Between the trees the ground was soon covered by grasses and shrubs which sprang up by natural regeneration. In their protection citrus fruits and olives, figs and pomegranates, grain, tomatoes, potatoes, peas, beans and onions now grow easily.

Reports of famine in the Sahel and Ethiopia are piling up besides reports of Aid. I have seen the splendour and the muddle of Aid in Agadir after the earthquake and I have seen it elsewhere. At best, the airlifts are no more than a staggeringly expensive way of keeping alive people who have lost their living and their livelihood.

Cash is a peripheral possession in the Sahara. Camels, cows, sheep, donkeys and goats are the measure of wealth. They produce milk, butter and cheese and, when they are past it, they are slaughtered for their milk and hides. This cycle has been disrupted. The photographs of dead cows we are all sick of mean the end of their way of life to many families of human beings.

Massive tree planting is the only way to halt the ravages of the Sahara and eventually drive it back. The Algerians are planting a great wall of trees, in places four miles deep, right across the country. This and the prime example of land reclamation achieved in Israel are the leads for all countries afflicted by drought, famine and floods. (Heavy rains in the Sahel now would cause floods. The remaining trees are being cut down in desperate attempts to save livestock. Without the protection of trees and other vegetation, the land gets like concrete and cannot absorb the essential rain.) If the kind of money needed for the airlifts had been used to plant a green wall of trees around the Sahara a decade ago, we should have a very different picture now. This is not smug hindsight, I have been advocating it since 1958. me were thriving. The next year the Algerian Ministry of Agriculture gave the project ten thousand trees and the Bou Saada authorities put all the land I could use at my disposition. With a team of local workers I then went on to reclaim 260 acres. We planted acacias and, following the blueprint I finalised



Desert Reclaimed 1970

In 1959 I went to live in North Africa, planting trees on the fringe of the Sahara. Since then the spread of the desert has become appalling. Now it is really flexing its muscles. In 1966 it measured roughly three thousand miles across, one thousand miles from north to south. Cameroon, the Central African Republic and Ethiopia were scarcely affected; Senegal, Gambia, Guinea and Somali were all still clear. Now even Kenya and Tanzania are threatened. The monstrous destruction of thousands of square miles of the good lands of Africa can and must be stopped.

FAO and UNESCO (Arid Zones Major Programme) were generous with information but had no money for "field work". Lord Boyd Orr created FAO after the second world war. Two years later he resigned, utterly dismayed by the bureaucratic behemoth he had begotten.

In 1963 I went to Bou Saada in Algeria. I knew from previous experience in Morocco that, once over the hump of selecting suitable trees, desert reclamation is simple.

The Algerians hesitated, understandably, until the thousand trees they gave in 1962, half the third block now produces food and forage.

Barley used to be the local crop but it was failing progressively. In 1967 I imported two pounds of California mariout barley; this produced 180 pounds of seed plus half a ton of straw, valuable forage for our horse and donkeys.

Trees cool the atmosphere to seven times their own height. The Bou Saada trees have stopped the sand storms which used to be a plague. In their shelter it is easy to grow cereals, fruit trees, vines and vegetables. Ten thousand laying hens have recently been added—so our pilot project makes a substantial contribution to local food production. It would be no problem to allocate pleasant space for housing. The Algerians who now run the plantation have put in forty beehives.

It costs about £85 per acre to get this barren land, formerly a French and then an Algerian Army dump, back to fertility.

For irrigation—and in 1966 when we undertook the first big planting we had only half an inch of rain—we brought water from the wadi, harnessed springs whose water was being lost, and used the waste water from the abattoir. The abattoir water was particularly valuable since it also acted as fertiliser. There is probably surface water going to waste in other parts of the Sahara.

There is more than enough water underlying the Sahara to reafforest the whole area. Vast aquifers, underground water courses, the reservoirs which have been building up for millions of years, stretch beneath it. The average depth is from 1,000 to 1,500 metres. However, this is a resource to be used with great care, with the co-operation of all governments and the United Nations. Often, oil companies reach water before drilling down to what they want. An engineer told me that it would be easy and relatively cheap to fit a sleeve pipe which would allow the water to come to the surface. Present practice is to block the water off with tons of cement. We grab the oil and starve the deserts-typical behaviour from Homo Sapiens, var. twentieth century. A clause about this should be written into all oil contracts.

It would be absurd for me to claim, on the basis of 260 acres—not even a pinpoint in the Sahara—that *I* have the answer to the Sahara and the other deserts of the world. The success of the pilot project is due to knowledge acquired over the years: from FAO and UNESCO and from Australian, American, Israeli and North African foresters. Uncannily similar blueprints have been evolved independently by James Sholto Douglas and Mahendra Prakash. Our system is efficient: we have all worked to prove it in Africa and India.

Lack of money and disbelief, plus the complacency of the "civilised world", have been our bugbears. The time has come for an enormous international effort. The lives unncessarily lost cannot be restored but there is no reason why the holocaust should not be terminated. With real co-operation from Governments, the World Bank, FAO, UNESCO and all men of good will, we could in a few years be driving the Sahara back in its tracks.

Donations or covenants to help with this work will be greatly appreciated, please write to Bou Saada Trust, c/o Messrs. Coutts & Co., 440 Strand, London WC2.

AUDIO-VISUAL AIDS IN ENVIRONMENTAL EDUCATION

Compiled by KATIE THEAR

The producers and distributors of audiovisual aids (or "non-books" as they are known in the trade) are listed alphabetically. It is as well to check prices as some may have been increased within the last few weeks.

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The Green Revolution Turns Sour

At least no one can say they have not been warned; disaster has struck Zambia's maize crop, the staple diet of millions of its people. Last year but one there was a virtual drought which destroyed much of the crop; this year the rainy season went on and on, doubling the normal rainfall in many areas.

Maize needs rain whilst it grows and a long hot dry spell to ripen it. Prolonged rain during the ripening period causes the grain to become subject to mould or to fungus growths, and if wet conditions continue it tends to simply rot on the stalk.

Normally the high plateau country of Central Africa has an ideal maize growing climate, but in recent years, as in many parts of the world, climate has become capricious and has tended to confound expectations based on what were thought to be established patterns. This year the crop has been badly affected by a fairly newly-identified mould called "fusarium" which tends to turn the maize pellets a dark purple in colour. Most countries have pretty stringent regulations regarding the maximum percentage of mouldincidence in a crop that may be marketed; in Zambia this is normally 2 per cent, and sacks containing more than 2 per cent are rejected by NAMBOARD, the official (and only) agricultural marketing board.

But so little is known about fusarium and its effects on the human body that Namboard refuses to accept maize for purchase containing any element of this mould at all.

There is good reason for its caution; it is known that when pigs are fed with fusarium-affected maize it causes a big drop in fertility and tends to contract the size of the sow's uterus; it also affects chickens in the same way and leads to a sharp decline in egg yields.

Yet maize currently submitted to Namboard by the farmers tends to contain as much as 20 per cent or even more infected by fusarium and Namboard is causing consternation by rejecting most of it outright. On this basis many farmers face bankruptcy and others are making moves to switch to other crops such as ground-nuts, sunflower or tobacco, which is thus putting to hazard next year's planting of maize.

Clearly the Government cannot just stand by and watch a large proportion of its commercial farmers go under, even though the use of the word "commercial" is a reminder that the vast majority of farmers are small-holders growing on a subsistence basis. For if subsistence farmers can be numbered in millions, and commercial farmers only in hundreds, nevertheless it is the latter who grow most of the crop, possibly as much as 90 per cent.

Yet there is more to this story than just a matter of tough luck owing to a very adverse growing season. For one thing there is evidence that fusarium occurs only in the new hybrid strains, which are so popular among commercial farmers owing to their high yields (sic!). There seem to be no reports of fusarium appearing in the crops of villagers using non-hybrid varieties of seed. This is not to say that the adverse weather has not affected the crop at all, but it does seem that what has been salvaged is at least edible even if its nutrition content may be lower than usual. At least one small farmer using hybrid seed but using organic soil replenishment has escaped fusarium trouble.

Another factor relates to harvesting.

A small grower, even a small commercial grower, can walk between his maize rows and pick out the bad cobs by hand, but a big scale farmer using combine harvesters is at a loss here, machines don't discriminate. One of the biggest concerns affected is Zam-Anglo, subsidiary of Angloa American, a company with vast copper stakes in Zambia, as well as gold and diamonds in South Africa. One of its "farms" near Lusaka, Zambia's capital, is around 20 sq. miles. Its management must regard the idea of a labour force to extract the bad cobs from its rolling miles as not so much impracticable as unthinkable. Yet if the crop could have been salvaged it might perhaps have given badly needed work to some of Lusaka's swollen army of unemployed for a fortnight.

But can the crop be salvaged? The extent of the fusarium infection suggests that even parts of the crop suffering no apparent damage must contain at least trace elements of the toxin.

The fact is no one knows, and no one knows either what the effects of even a mild ingestion of the toxin might be on the human body. It was doubtless this imposing ignorance which led one of the two Zambian daily papers to opine recently in an editorial that Namboard would have to purchase the crop, if only to save the commercial farmers from bankruptcy, and even if this meant burning what was bought.

Talks are going on between Government and the farmers to settle the matter. No doubt if Zam-Anglo received nothing for its crop at all the vast reserves of its parent company would enable it to weather the storm, but there is no doubt that without Government help many of the big farmers will face ruin.

For Zambia too the consequences are likely to be serious-even if disaster



in terms of starvation can be avoided owing to the riches it obtains from its copper. Nevertheless for Zambia to have to purchase maize from other countries would mean diverting expenditure from other spheres such as improved schools, medical services, rural development, and with copper prices already plummeting from the 1973 peak, this could create some awkward political strains.

But Zambia will survive, and with a population density in many areas of one person per sq. mile (O Paradise! O Shangri La! O Eldorado!) if the Government proved unable to feed the swelling numbers of its urban areas, people would simply have to go back to the land in order to live.

In this regard Zambia is very much a special case (ample land, national riches from copper and low population). What would happen if this kind of crop disaster struck India or China, any other densely populated OF country? The lesson here at least is two-fold. The use of hybrid seed seems to be based on the assumed stability of other factors (such as climate, although this is by no means the only one), which the event does not always justify. Indeed it assumes a stability of forces each of which is dynamic and which makes the assumption therefore inherently untenable.

Secondly there is the factor of scale. It is the big farmers who face ruin here without Government help, not the small ones. The very smallness of the scale on which the latter operate means they can do something to correct nature's vagaries when they become too imposing, especially if they are using local seed adapted to local conditions rather than rarified hybrids. Two years ago when the rains came too little and too late, big-scale farmers watched helplessly as the sun scorched their crops to lifelessness; meanwhile countless small farmers carried water by hand from streams and wells and saved their crops at the expenditure of nothing more than the effort involved.

The major lesson seems to be that any country which comes to depend on hybrid seeds for its food crops is asking for trouble, and that any country which is dependent on the efforts of large-scale farming operations to grow them is sitting on its hind legs and begging for it.

Prester John



Exchanging food and fertility

THE POLLINATION OF FLOWERS by Michael Proctor and Peter Yeo. Collins, £4. A FIELD GUIDE TO THE INSECTS OF BRITAIN AND NORTHERN EUROPE by Michael Chinery. Collins, £2.95. THE WILD FLOWERS OF BRITAIN AND NORTHERN EUROPE by Richard Fitter, Alastair Fitter and Marjorie Blamey. Collins, £1.60.

Insects do not have the large and enthusiastic following that birds and flowers have, and accordingly there are few good books on them. The following will remain small for as long as publishers allow this odd deficiency to persist. Insects are quite as beautiful and interesting as birds and flowers and no more difficult to study. Perhaps the number of species—over 20,000 in Britain alone—is daunting, but basically this neglect is due to a lack of well-illustrated identification guides to the major insect orders (apart from butterflies).

The publication of *The Pollination* of flowers and *A field guide to the insects of Britain and Northern Europe* is therefore very welcome. Pollination is one of the most satisfying subjects for field study for anyone interested in ecology. It provides perhaps the most accessible examples of interdependence and co-evolution, as well as being a process of great beauty. There can be few more attractive sights than a butterfly or a bumble-bee on a flower, exchanging fertility for food.

The pollination of flowers provides as complete an introduction to the subject as anyone could want. Naturally, most of the book is devoted to pollination by insects, although there are separate chapters on pollination by wind and water, self-pollination and apomixis (a portmanteau term for the various substitutes for the sexual production of seeds, such as the production of bulbils by garlics). The mechanical details of pollination are well described and there are excellent surveys of the different types of insectpollinated flowers and of the principal pollinating orders—the Hymenoptera (bees, wasps, etc.), Diptera (flies), Coleoptera (beetles) and Lepidoptera (butterflies and moths).

Perhaps the most interesting chapter is on pollination in the tropics, where birds and even bats play a prominent role. Least satisfactory is that on the pollination of food-plants. Written before the publication of J. B. Free's definitive *Insect Pollination of Crops* (Academic Press, £7.25), it is rather too glib in its assumption that eventually wild insects will be managed.

A field guide to the insects of Britain and Northern Europe cannot be said to fill a gap because the gap is much too large to be plugged by any one book. It provides an invaluable introduction to all the insect orders to be found in Britain and northern Europe, but it is still more useful for its keys to the major families within these orders. Anyone who can allocate an insect to its correct family has learned a great deal.

Inevitably, however, the observer wants to identify the insect at the level of the genus, if not the species. Clearly, it is impossible for a single volume to provide illustrated keys to all genera, and to curse a field guide to insects for not including the genera you want is perhaps unfair. Nonetheless, it does seem foolish to waste space on butterflies when Collins have already devoted an unrivalled field guide to them. The three pages of plates would have been better devoted to illustrating—say—the 26 different species of bumble-bee found in Britain.

Anybody inspired by the Field Guide to insects to concentrate on a particular order (like bees or flies) is doomed to frustration. The numerous volumes of Handbooks to the identification of British insects are unobtainable. One way round the problem might be to publish a more detailed guide to fewer families: for instance, a field guide to the major pollinating insects of Britain and northern Europe.

Lusaka, 12.7.74. Ecologist, Vol. 4, No. 8

The other partners in pollination, the flowers, have long been much better served. The Wild flowers of Britain and Northern Europe has therefore to compete with a number of good guides, including one from Collins. In my opinion it wins. It is magnificently illustrated by Marjorie Blamey, but its special merit is in the keys. These consist of general keys, ideal for the beginner, and special keys for tricky groups like the Umbellifers. Whatever guide you already have to wild flowers, get this one as well.

Robert Allen

Audio-visual aids

DIANA WYLLIE LTD Film strip sets with lecture notes. SEMINAR CASSETTES. CONCORD FILMS COUN-CIL

Those who acknowledge the inescapable facts that The Ecologist has been hammering home for several years find it hard to realise that the vast

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majority of people are still very far from convinced. This is not only because the opportunities offered to their disbelief are legion, and because the Government are concerned to keep them in cosy ignorance by hiding the bleak truth behind glib promises of a good life in the future; but also because Ecology and its related subjects are only now beginning to be included in educational curricula in this country. For those who are trying to get through this wall of incredulity any sort of audio-visual aid which can capture a new audience is valid.

Among the best of these are Diana Wyllie's Filmstrip series on the environment, which can make a valuable contribution to any syllabus on these subjects in secondary schools, colleges and adult education classes. The filmstrips are imaginatively produced, in colour, and illustrate their points with admirable directness. They are accompanied by thoughtful and comprehensive lecture notes in booklet form. A great deal of trouble has evidently been taken in the preparation of these aids. The lecture notes are written by experts in their own fields which ensures that even an inexperienced teacher can deliver a compelling and authoritative commentary as the slides are shown.

Seminar Cassettes have produced five titles under the general heading Life on this Earth. There is no doubt at all about the quality of the speakers in this series-Dr Alexander King, Dr Aurelio Peccei, Thor Heyerdahl and Gerald Durrell among them. But these lectures last anything from 20 minutes to a full half hour, and to listen for that length of time, and to concentrate on an unseen speaker, requires an audience already practised in the art. But given that you have a captive and committed audience this is excellent stuff.

Concord Films Council have among their titles a few films which are useful and easily comprehensible. They do not contribute very greatly to the sum total of our knowledge, but they will waken the sleeping conscience of those who have not yet discovered the awfulness of man's desecration of the world. Recent issues are: Brave New World, a 12 minute silent Hungarian film which eloquently illustrates the horrors of urban pollution as it spreads across the countryside, and Into Your Hands, a story of conservation in Australia.

Ruth Lumley-Smith

A NEW addition to our series of filmstrip/slide sets on the ENVIRONMENT "WASTE AND RE-CYCLING" by TOM BURKE of Friends of the Earth Also available in the series: POPULATION AND Resources . . . Parts 1 & 2 WATER POLLUTION Parts 1 & 2 AIR POLLUTION Parts 1 & 2 THE AIR YOU BREATHE NATURE CONSERVATION IN THE BRITISH ISLES MAN-MADE WORLD Parts 1, 2, 3 & 4 . . . (Architectural) NOTE: Pictures supplied in 35mm filmstrip form and may easily be cut and mounted as individual slides. DW SLIDE MOUNTS are available at 75p for 100. Allow 45-50 mounts for each part.

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Vanishing resources

ENERGY ECOLOGY ECON-OMY by G. Garvey, Macmillan, £2.95.

RESOURCES by John Burton, Blackie, £1.55.

These books are intended for very different audiences-the second being part of a school series-but they both provide stimulating information on our "crisis of crises". Professor Garvey's book was begun after an "Energy and Environment" conference at Princeton University in 1970, and has gradually been developed as a review of economic policy changes that could be effected to begin to make our societies more appropriate in an ecological sense. This will require major, structural change and Professor Garvey does not shrink from the hugely-ramifying wholesale change that will have to occur if we stop valuing the environment as a "free good" and begin to take account, in today's prices, of the probable lifetime of vital resources. Both books show the growth economy as pincered by multiple forces into a position where it simply has to change.

Both books also look at energy costs and efficiencies. The gross inefficiency of centralised electricity production is shown-yet it is, remarkably in this sector that Western governments, almost without exception, are frenziedly pumping capital. This can only be to arrest change for as long as possible, to try and thwart the inevitable decentralisation, return of labour intensive food production, and change of society and culture that structural energy shortage will bring. Nuclear power appears to offer the "only way out", but both books show nuclear energy as an ultimate zero-sum game. If it goes wrong it could wipe out most life forms on earth! Are concrete cities and plastic toys worth this risk?

Time after time both books bring up the problems that are already beginning to rain on world society. Food: how can production go on increasing as energy supplies falter, erosion increases, climates change unfavourably, and population expands exponentially? Minerals: many are beginning to tighten up in supply; what happens when other sections—the other two

thirds—of the world's population demands supply, or witholds production? The crises of day-to-day life in the west—like traffic jams, consumerism, urban housing quality—are shown to be incredibly hollow in relation to the life or death crisis that is taking over more and more Third World societies. But both books give fair and full treatment to the *underlying* ecology crisis.

Garvey titles his book with a "trinity" of factors that have become ever more vital to human societies. Of these ecology is undoubtedly the holiest. The costs of environmental mismanagement are always a reduction of population carrying capacity in the long term. With world population increasing at $1\frac{1}{2}$ millions per week it is hardly the time to be reducing the number who can, in the long term, be supported in stable ways.

Both books look to alternatives. They are not fully laid out however. Garvey sticks to the price mechanism, economic policy and certain social change (e.g. the switch to public transport) as the methods for re-organising western industrial society. Both authors also briefly cover some of the renewable energy sources-those that will have to be basic by the end of the century on present trends. Solar collectors are shown in Burton's book, windmills are mentioned, and both books give passing reference to geothermal, wave, and tidal power. After these, however, the huge gap between what is available on a long term basis, and the giant energy demands of today, becomes more and more evident. Neither author really probes this fascinating area, but it is from here that the most drastic changes will come.

Andrew MacKillop

Ecological virtue

CONSUMERS' GUIDE TO THE PROTECTION OF THE ENVIRONMENT by Jonathan Holliman. Pan/Ballantine, 50p.

Jonathan Holliman's Consumers' Guide to the Protection of the Environment is an exhaustive compendium of practical hints for the individual wishing to minimise the harmful environmental impact of his everyday activities. Whether you want to make your own brass-polish, attract birds to your garden, wash with Kosher soap or grow

thing here for you. One point which cannot be stressed too often is how much cheaper it is to tread the path of ecological virtue: this book has plenty of tips on cutting consumption of power and goods which are worth taking whether or not you care two pins about the environment. Holliman is obviously on the side of the angels: but his book is not entirely satisfactory, for all that. Its message is a dangerously comforting one: it does not demand that we make any fundamental changes in our lifestyle. Injunctions like "use the dishwasher only when you have a full load" or "keep the car in good repair" are about as relevant to our real problems as telling a man in a crashing plane that he'll feel better if he loosens his collar. Certainly we should encourage people to be aware of environmental problems, and to adjust their everyday life accordingly: but the adjustment needs to be a radical one, not just a salve to the bourgeois conscience. To be fair. Holliman does say it's even better not to have a dishwasher or a car at all; but his general tone tends to confirm the left-wing criticisms of environmentalism as a middle-class fad. His book will help you to cut your housekeeping costs, with minor beneficial side-effects on the environment; it contains handy summaries of the problems of transport, water supply, food additives and so forth: but if you want a blueprint for post-industrial living you must look elsewhere.

mushrooms on the lawn, there is some-

Nicholas Gould

The latest edition of the GUIDE TO RESOURCES IN ENVIRON-MENTAL EDUCATION by Peter S. Berry is now OUT. It comprises lists of periodicals and books with environmental themes; recommended games, charts, films, and radio and television broadcasts suitable for schoolchildren. It gives information on school examinations in environmental studies/ science, college courses, and organisations concerned with environmental matters.

With the increasing number of courses in environmental studies in schools and colleges this guide will be valuable in preparing and organising curricula. It can be obtained from Peter Berry, 246 London Road, Earley, Reading, RG6 1AJ, price 20p + 10p p & p.

Natural remedies

THE ILLUSTRATED HERB-AL HANDBOOK by Juliette de Baïracli Levy, Faber & Faber Limited, £2.50.

Among the proliferation of herbal books and magazines today this book stands as a major work. Juliette de Baïracli Levy is an international nomad who has spent most of her life studying and using herbal medicine, gathering her information from gypsies, Bedouin Arabs, American and Mexican Indians. Not merely descending on these people and swiping a few recipes, but living and working with them, sharing their lives and hardships and their knowledge of these subtle nature remedies.

In using any of these cures we must remember some of the shortcomings of modern "doctoring" and aid the action of herbs with fasting, rest, ample sleep, and fresh air. Above all not expecting the rapid, if temporary results we are accustomed to receive from modern drugs. Throughout the book Miss Levy stresses the safety of her methods and freedom from unpleasant side effects, although she does mention that in some cases symptoms can increase for a short time.

Herbs for cooking and cosmetic use are adequately covered including recipes using leaves of trees, an aspect of herbal practice somewhat neglected. Complexion lotion made from elder blossom, hair tonic and setting lotion from sage and rosemary are described. even a lotion for fragrant breath! When beauty's needs are satisfied we can turn our attention to gorse blossom champagne and strawberry liqueur. There is a good chapter on herbs for the garden and orchard. Cayenne pepper, and aromatic herbs like wormwood, southernwood, mugwort and rue feature in insect and bird repellents, while sage used in compost or mulches is apparently a powerful stimulant to plant growth, especially with the vine.

The majority of Miss Levy's book is taken up with an excellent Materia Medica with cures for minor ailments like sunburn (burnet or sow-thistle milk), blood and nerve tonic (blackberry, cornflower, oats or thrift), and laxative effects from rhubarb, iris root or caraway. Blackcurrant for quinsey, cranesbill for dysentery and elder for dropsy and kidney disorders are a few of the remedies for more serious complaints. Many of the herbs listed have a multitude of uses and I wonder if there is not a strong case for new research into the most effective combinations of these. The reader could be baffled by the wide range of herbs available for the treatment of each complaint.

In the hands of an experienced herbalist simple treatments have achieved spectacular results, curing many obstinate ailments, but herbalists of the stature of Miss Levy are few. How many really practice what they study? If the lack be in detailed information then possession of this book will leave us no excuse for failing to use this very real alternative to modern medicine.



The Politics of Education A Symposium Nos. 10 and 11 50p Winter : Spring, 1974

GRYPHON PRESS

Trevor Lawrence

A READING AND REFERENCE LIST FOR "A" AND "S" LEVEL BIOLOGY

BY

G. W. Shaw, M.A., D.Sc., F.I.Biol. Lancing College, Sussex.

Reprints of the Reading List can be obtained from:

Dr. G. W. Shaw at Lancing College, Sussex Please send stamped addressed envelope (9" × 6")

THIS MONTH'S

AUTHORS

John Adams is a lecturer in geography at London University.

Peter Abbs is editor of TRACT published by the Gryphon Press

Cleeland Bean is a freelance writer specialising in environmental problems, living in Northern Ireland.

Andrew MacKillop is managing director of Low Impact Technology and an associate editor of *The Ecologist*.

Wendy Campbell-Purdie founded the Bou Saada Trust of which she is now the Director.



Sir,

I do not know whether this subject has any connection with Ecology, but it is curious and I wonder if any of your readers have had a similiar experience or can explain the phenomenon. Four or five years ago every year large numbers of dandelions appeared on our lawn. Various weed killers were tried but with little or no effect. Trying to dig them up by the roots was too laborious. Ultimately my remedy was to cut off the flowers only whenever they appeared, my object being to prevent the seed from further proliferation. Last year, 1973, was the last year I did this. This year to my mind a remarkable thing has happened. Hardly a single dandelion has appeared but in their place large numbers of daisies and buttercups have grown. Now I happen to like both daisies and buttercups but I dislike dandelions. So I am quite satisfied.

Yours faithfully, H. R. Petty, Novar Edgar Road, Winchester.

Sir,

I find many of your articles relating to ecology excellent, but strongly object to Polly Glaster's controversial Report on the political angles of the Cabora Bassa dam. The inclusion of this can only discredit your publication. For example: it is absurd to describe Cabora Bassa as a "crime against the people of Africa", and to say "The rights of the people who live in the Zambesi valley have been viciously trampled on. At least 25,000 have been evicted from their homes to make way for the project". In a great many countries a great many people have been evicted from their homes to make way for hydro-electric schemes. One wonders: 1, why such eviction is only a crime at Cabora Bassa; 2. whether your reporter would prefer oil or coal or nuclear powered generating plants, or no electricity; 3,

whether your reporter will still regard Cabora Bassa as a crime when it passes into the hands of the Blacks, as seems likely. Unless your paper is renamed "The Ecologist and pro-Frelimo propagandist", I suggest you avoid such unfair, one-sided and ecologically irrelevant reports. Yours faithfully, *A. P. de Villiers*, Kumeu, Auckland,

New Zealand.

I refer you to the immense literature published on large dams. In every case their construction has given rise to a host of serious biological, social and ecological side effects: water logging in the Indus Valley, salinisation, generalised river blindness (Volta Dam), earthquakes (Kariba Dam), loss of soil fertility, evaporation, erosion of the coastline and generalised bilharzia (Aswan Dam).

What benefits are to be derived from them? Mainly more energy for development. It has been the theme of the Ecologist for the last four years that development is an unmitigated catastrophe. What is needed is de-development even in Africa.

Editor

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Make sure of your copy of THE ECOLOGIST by taking out an annual subscription. Ordinary rate £4.75. (U.S.A. \$12.00). Members of the Conservation Society, Friends of the Earth, The Soil Association, Henry Doubleday Research Association £4.25. Students attending a full time course £3.75.

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Further information concerning the post and general conditions of service should be obtained from the Registrar, University of Cape Town, Private Bag, Rondebosch, 7700, South Africa, by whom applications must be received not later than 1st November, 1974.

Appointment will be subject to a satisfactory medical examination. The University reserves the right to appoint a person other than one of the applicants or to make no appointment.

B.....

ECOLOGIST NEEDED

ECOLOGIST NEEDED An ambitious social-ecological project in Patagonia is being planned by an interdisciplinary group at Lancaster University. The aim is to establish a community in ecological equilibrium with its natural environment and to conduct research to evaluate its effect on a previously undisturbed ecosystem. An ecologist is needed to co-ordinate plans for ecological research and to attend a meeting in Talca in Novem-ber. He/she should be familiar with systems ecology and interested in developing a predictive model of an ecosystem in a relatively small and well-defined area. A knowledge of Spanish would be helpful but is not mandatory. Write to Valadez and Miall, Programme of Peace and Conflict Research, Lancaster University.

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COMPETITIONS

THE DESIGN COUNCIL in conjunction with the British Tourist Authority is holding a competition to encourage publishers, authors, designers, printers, local authorities and other interested parties to produce well designed and interesting guide books. This competition is being organised as part of the British contribu-tion to European Architectural Heritage Year tion to European Architectural Heritage Year 1975. The sponsors, who recognise the need to preserve our heritage for the general public to enjoy, realise that the presentation of the information that guide books offer on our architectural history contributes both to our appreciation of the past and our concern for the design of our present environment. For the purpose of this competition a guide book is defined as a book, leaflet, folder or other publication printed in Britain, that gives guidance and information about the architecture history and information about the architecture, history and amenities of counties, cities, towns, villages and places of interest in the UK.

The closing date for submissions is 17th January 1975. Further details and entry forms from Peter Smith, The Design Council, 28 Haymarket, London SW1Y 4SU.

CONFERENCES

ECOLOGIST CONFERENCE ON ECOLO-GY AND RELIGION. A 2-day conference at Conway Hall, Red Lion Square, London WC1, on 28th and 29th November 1974. Fee £5. Students £2.50. Closing date for registration— 22nd November. The Ecologist, 73 Moles-worth Street, Wadebridge, Cornwall PL27 7DS.

IF YOU WISH TO INFORM the actively interested people of your forthcoming confer-ence-your notice should be HERE.

NEW VILLAGES ASSOCIATION

THE ENCOURAGING RESPONSE to the leaflet "Back to the Land" has demon-strated that there is widespread support for the ideas put forward there. It is clear that there are now enough people with ecological awareness and responsibility to try and start one or more prototype villages of sufficient size (about 500 to 1500 people) to permit an independent internal economy.

AIMS

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1. Join the New Villages Association by sending £1 subscription (or more if you can afford it-or less if you can't!).

Tell us what relevant skills you already have. Decide on one or more appropriate skills that you can acquire, learn and become proficient in. Build up a kit of tools. Con-sider getting a job relating to the chosen skill. Let us know your choice to help us coordinate and put you in touch with others doing the same.

3. If you have a specific knowledge or if you are prepared to study a subject in depth, to help with the planning, please let us know your area of specialisation.

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PUBLICATIONS

THE SELF RELIANCE NEWSLETTER is for people who feel that they suffer from an excessive dependence on our modern technological society. £1 subscription to Colin Richardson, 29 Dartmouth Ave., Huddersfield. COMPOST SCIENCE—American bi-monthly communicating special knowledge and experience in utilising the commercial values of urban and industrial waste and effluent. One year's subscription £2.70 from the Ecologist, 73 Molesworth Street, Wadebridge, Cornwall PL27 7DS.

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REGULAR READERS of the Ecologist over the last year will have noticed a steady increase in the classifieds. This month we leap to three pages and look like staying there. The reason for this growth is results. The ads bring a good response so they increase. Why not make use of our columns yourself? It's an inexpensive way of sounding out ideas or hare-brained schemes, buying or selling anything relevant or just contacting like-minded people. Expand your experience—take part—Katie.

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This is the theme of the two-day conference organised by The ECOLOGIST to be held at Conway Hall, Red Lion Square, London W.C.1 on Thursday and Friday 28th and 29th November 1974. Chairmen: Father Adrian Hastings. Peter Cadogan, General Secretary of South Place Ethical Society.

Speakers: Robert Waller, Author and associate editor of the Ecologist. Antoine Stanislaus, Sinhalese Anthropologist. Robert Allen, Author and Ecologist. Satish Kumar, Editor of Resurgence. Jimoh Omo Fadaka, Associate editor of The Ecologist. Edward Goldsmith, Publisher and Editor of The Ecologist.

FEE: £5.00. Students £2.50.

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