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Editorial

THE TEST TUBE FIXATION

Scientists accept at least some of the blame for the mess we are in. That is why there is now a British Society for Social Responsibility in Science. After all, without scientists there would be no atom bombs, no biological warfare, and none of the pollutants which pollute our rivers the air we breathe and the food we eat. Nor for that matter would there be an energy crisis, because we would never have mastered, without Science, the secret of harnessing the energy locked up in fossil fuels, and would never thereby have become so dependent on their continued availability. It is nevertheless generally maintained that the services of Scientists are required to get us out of our present mess. But are they actually doing anything constructive in this direction? A casual glance at their current activities, as reflected in the papers published in that august periodical Nature. is disillusioning on this score.

Instead of publishing information that can help us solve the problems which are menacing the very survival of man on this planet, *Nature* continues undaunted to describe the results of boring, trivial and largely irrelevant experiments.

Consider the following typical titles from the last issue: "Anomalies in particle shape during seeded growth of polystyrene latices." "Fever in the lizard." "Relationship of a-adrenergic receptors in rat pineal gland to drug-induced stimulation of phospholipid metabolism."

Worse still, when anyone from outside the Scientific Establishment attempts to do anything constructive, a veritable witch-hunt is mounted against him. The Limits to Growth, for instance, was mercilessly attacked, as was our Blueprint for Survival. In the same way the Catholic establishment of the Middle Ages would have excommunicated a heretic whose teachings constituted a challenge to their authority.

The latest witch-hunt has been mounted against the International Cultural Foundation which has dared do something really constructive: Organise a series of conferences on the Unity of the Sciences, of which the third took place in November in London. Both Nature (Bringing Men to the Moon October 25) and New Scientist (Neither Unity nor Science, November 28), have published hysterical denunciations of this conference. The main reason is that the foundation in question is financed by the Rev. Sun Myung Moon, a South Korean Evangelist, who also started the Unification Church. What is wrong with Mr. Moon? Why is he so undesirable as a sponsor? Apparently for two reasons, firstly because of his theological theories whose conclusions can clearly not be tested in controlled laboratory conditions, and secondly because of his distaste for Communism. Are these reasons for undermining a conference organised by a Foundation which he happens to finance? I would have thought that his personal opinions were irrelevant. After all, Ford is supposed to have said, "History is bunk", yet this does not appear to have prevented even the most scrupulous historians from availing themselves of the facilities offered by the Ford Foundation. As for his dislike for Communism, so what? Mr. Harold Wilson dislikes Conservatism, Mr. Edward Heath dislikes Socialism. Mr. Jeremy Thorpe dislikes both Conservatism and Socialism. All three dislike Fascism. Does this mean that academics should selfrighteously decline to attend conferences sponsored by a Government which one of these politicians might happen to head? Or is a dislike of Communism more serious a prejudice than a dislike of any other ism? If so, why? Is Dialectical Materialism verifiable in controlled laboratory conditions? Is it a sine qua non of academic respectability to pay lip-service to the theories of Karl Marx?

The trouble is, of course, that many second rate scientists feel threatened by an enterprise which seeks to bring about radical changes to their lives. They want to be able to go on indefinitely playing their little games in their laboratories, while, were Science to be unified, they would undoubtedly be forced into more constructive occupations. It is this, they apparently wish so desperately to avoid.

From the point of view of society at large, however, Mr. Moon's initiative cannot be too highly commended. The biosphere of which we are part, developed as a single process and is a single integrated system. It cannot begin to be understood in terms of the separate disciplines into which science is at present divided. Interpretations and predictions based on knowledge limited to a particular discipline must inevitably be wrong. Consider the Green Revolution. It has been a disastrous failure mainly because it was the work of plant geneticists working in a vacuum.

The strains of rice and wheat which they developed would indeed produce more food, but only if one assumed ideal conditions in a large number of other areas, of which the plant geneticists had no knowledge. For instance, insect pests had to behave themselves. Irrigation water had to be available as did vast quantities of fertiliser and agricultural machinery etc. The world's transport systems had to be adequate to support the strain of transporting these things to where they were required. The political situation had to be ideal to avoid interferences from that direction. House building programmes had to be possible to accommodate all the small farmers and agricultural labourers made redundant by the industrialisation of agriculture. Jobs had to be available for them, also schools and roads, sewage works and other services. Producers of essential and increasingly scarce primary products like petroleum, phosphates etc., had to behave in a saintly manner and refrain from putting up their prices. The climate too, had to be ideal, for the new strains were untested in poor weather conditions. If all these conditions had been satisfied then the Green Revolution might indeed have worked.

But there was no reason whatsoever for supposing that they would be. In fact it could be predicted

that the introduction of the Green Revolution would actually cause these conditions to become ever less well satisfied.

Indeed, until Science is unified it can serve but as a means for further disrupting the biological, social and ecological systems upon which life depends.

Edward Goldsmith



by Robert Allen

Meat must play a part in our diet, mainly because it is our only source of long-chain polyunsaturated fats, which are particularly necessary for building our nerve and brain tissue.

What is more, in intensively reared animals, both the lean protein-rich meat, and the polyunsaturated fats are to a large extent replaced by unsaturated, or adipose fats, which are useless for building tissue and can only be used as fuel. According to Michael Crawford of the Nuffield Institute, eating this degenerate meat is the main cause of the present epidemic of ischaemic heart disease.

Do we need meat? Until recently, it was thought that the most important nutrient provided by meat was protein, in the form of a wide and balanced range of amino-acids. Since it is possible to contrive a similar range and balance from a combination of legumes like soya beans, other proteinaceous plants and synthetic proteins, it has been and still is argued that meat is no longer necessary. It is also suggested that rearing animals is wasteful of land and is a prohibitively expensive way of avoiding protein malnutrition.

Recent research, however, particularly that of Dr. Michael Crawford and his colleagues at the Nuffield Institute of Comparative Medicine, London, demonstrates that this is a gross over-simplification. This research strongly suggests that animal products are essential as a vital source of long-chain unsaturated fatty acids — without which human brain development may be impaired. In fact it is fully possible that lipid



Intensive calf rearing

malnutrition is a more serious problem than protein malnutrition.

It is not generally known that animals lay down two types of fat: (1) adipose storage fat; mainly triglyceride, rich in nonessential saturated fats as an energy store; (2) structural fats; mainly phosphosphingo-lipid and sterols, rich in 'essential' or long chain polyunsaturated fatty acids. Adipose fat is what we normally think of as fat: the stuff we see on meat and which is the fatness of a fat person. Structural fat is less well known, yet more important. As its name implies, it is a vital group of building blocks for cell construction. In advanced life forms like man and the animals he eats, cells are made up of proteins, polyhydric alcohols and lipids - or fatty acids. The proportions vary, depending on the type and structure of the cell: thus fatty acids may make up as much as 15% of a muscle cell, 50% of a cell in the grey matter of the brain, and 70% of one in the white matter.

ust as there are essential amino acids in proteins, so there are essential fatty acids in structural lipids which cannot be synthesised directly from plants. There are two of these: from seeds and linoleic acid from leaves. linolenic acid Herbivores generally eat both leaf and seed, though in very different combinations. After absorption of the acids contained in this material, the liver metabolises them, increasing both the chain lengths and the degree of unsaturation by adding extra double bonds. Thus linoleic acid is increased from 18 carbons and 2 double bonds to 20 carbons and 4 double bonds; and linolenic acid is increased from 18 carbons and 3 double bonds to 20 carbons and 5 double bonds, 22 carbons and 5 double bonds, and 22 carbons and 6 double bonds.

Michael Crawford and A. J. Sinclair have shown that among mammals although muscle tissue protein has a similar composition



irrespective of species or feeding habits there are marked differences in fatty acids. In particular, there is a "progression in the proportion of long chain acids and in the degree of unsaturation from the herbivore to the carnivore". This is because when one animal eats another, it eats not only protein and the phospholipids but also their long-chain derivatives. The herbivore eats only the original (plant) polyunsaturated fatty acids, but the carnivore (including man) eats both these and the lengthened and further unsaturated ones.

According to Crawford and Sinclair, "this change in the profile from herbivore to carnivore is of particular interest, because if we were to continue the progression, to reduce the parent acids (linoleic and linolenic) to below 1% and increase the long-chain acids correspondingly, we would have in effect the profile of the brain fatty acids. These are dominated by the longchain acids and the parent acids are present in relatively insignificant amounts." In other words, all but a small proportion of the fatty acids which make up 50-70% of the human brain are not those found in plants, but those exclusively contained in meat (including fish).

The proportion of brain to body in herbivores is of the order of 0.05%. The proportion in carnivores is of the order of 0.5%, and in man2%. It is not without significance that a horse or cow lays down more protein-rich tissue in a year than a man does in twenty, but what it does not do is lay down the tissues rich in structural fats such as are found in the human brain. The herbivore's brain is smaller than the carnivore's possibly because it has to lengthen the parent acids from the plant itself. A carnivore however can by-pass this procedure by directly eating those fatty acids lengthened by the herbivore as well as the parent acids.

What is interesting is that the examination of wild cow species like the buffalo shows that the ratio is very similar to that of free-living domesticated species. It is only when the animals are exposed to the highly artificial conditions of industrialised agriculture that we observe such radical changes.

One of the main reasons why it has taken so long to appreciate that animals are such an important source of long-chain structural fats is that modern intensively reared domestic animals are fed on high-energy feedstock and allowed virtually no exercise and no opportunity to select a wide range of leaf and seed foods. This situation results in a heavy deposition of adipose fat (mainly triglyceride), which also infiltrates muscle tissue, producing as a result the effect known as 'marbling'.

Unfortunately, there is good evidence that fatty acids compete with each other during their metabolism to structural constituents, so that under such conditions triglycerides replace phospholipids in muscle tissues. In free-range animals the proportion of adipose fat to solid nutrients (including protein and structural lipids) is 1:3 (5 per cent carcass fat; 75 per cent lean, including 15 per cent solid nutrients). In intensively reared animals the proportion is reversed to 3:1 (30 per cent carcass fat; 50 per cent lean, including 10 per cent solid nutrients – the rest is water).

learly, intensively reared domestic animals have been unable to adapt to the change of conditions. This being the case, it is unlikely that we have adapted to the altered structure of the meat we eat. The word 'adapt' is often used loosely, as if it meant 'tolerate'. But this is ot the case. A man working in abnormally noisy conditions may tolerate them, but eventually he will go deaf. His deafness indicates that he has not adapted to those conditions and the provision of a deaf-aid is at best mock-adaptation. Similarly, children not only tolerate but actually enjoy food that requires no chewing and contains large quantities of sugar. A very high incidence of dental caries, however, indicates that they cannot adapt to such a diet, and once again the provision of dentures is merelymock-adaptation.

Men are adaptable, but they are not infinitely adaptable. Adaptation does not occur at speeds and intensities of our choosing, but in accordance (amongst other things) with the principle of the optimum. That is to say, there is an optimum value for all the variables of a biological system; to a greater or lesser extent there are tolerance margins on either side of the optimum, which if exceeded will increase the randomness or unpredictability of the system, and hence decrease the prospects for survival of the system as a whole and/or its components. In every case what is the optimum value is determined by its evolutionary experience and its consequent capacity for adaptation.

Human manipulation of biological systems is not necessarily unnatural, nor is its impact necessarily suboptimal. All creatures have an impact on their environment, for example coral polyps and their reef, or oaks in an oak wood. Man is no exception, and for the greater part of his evolutionary career, his impact has been within the optimal range. Before man turned to agriculture, beavers had a much greater impact on the environment than he did the flat meadow land in the Rocky Mountain region is one result of their activities.

Even after the domestication of animals and plants, man's impact often remained optimal. Farming and pastoralism are not of themselves unnatural – there are species of ants which grow fungi, and others which herd aphids for the sweet liquid they exude.

Harding of the changing fat ratios of domestic animals, discussed earlier, show that recently our impact has become sub-optional. What is interesting is that the examination

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Flesh of wild buffalo - showing high proportion of lean meat.

of wild cow species like the buffalo shows that the ratio is very similar to that of free-living domesticated species. It is only when the animals are exposed to the highly artificial conditions of industrialised agriculture that we observe such radical changes.

This is an excellent illustration of the principle of the optimum: adaptation takes time, and on this evolutionary basis we may say that the circumstances of wild animals are optimal; those of free-ranging domesticated animals are either within their tolerance margins, or the changes to those conditions proceeded at a rate to which the animals could adapt. Those of today's intensively reared animals on the other hand are not optimal, for the changes are occurring too rapidly. Natural systems are resilient and can adapt to change, but only change of certain intensities and occurring at a certain rate.

Human beings, their bodies and their minds, are not exempt from this principle of the optimum. It is therefore not surprising that there should be evidence of our failure to adapt to our radically altered diet. Dr. Haqvin Malmros of the Laboratory for the Study of Atherosclerosis at Lund University, Sweden, has shown that arterial disease can be produced experimentally by providing diets high in either carbohydrates or saturated fats, the latter being the more dangerous, and that poly-unsaturated fats can protect against experimental conditions and

even remedy it. We have seen how important structural fats are for brain cell construction. Their absence, and replacement by saturated fats probably has a serious effect on the cell structure of the heart and arteries. A low structural, high saturated fat diet is thus implicated in cardiac and arterial degeneration.

ecause so much intensively reared meat is eaten in the industrial world and so little meat of any description is eaten in the non industrial world, it is likely that people in the former are exposing themselves to a health hazard while many in the latter could be suffering an acute fatty acid deficiency. Meat substitutes extenders and analogues and other high protein supplements, since they are made from vegetables like soya will not correct beans. this deficiency. Indeed, they can make it worse.

There is, in fact, evidence that high protein supplements so accelerate protein synthesis that it gets out of phase with lipid synthesis, leading to qualitative changes in the development of nervous tissue. Hansen has described how children suffering from kwashiorkor were fed on high protein diets which precipitated a gross fatty acid deficiency. It must be borne in mind that there is a fundamental difference between amino-acid deficiency and fatty acid deficiency. When an essential amino acid is deficient all that happens is that



Flesh of intensively reared domestic beef showing marbling

less protein is made, but the protein is balanced (normal). However when an essential fatty acid is deficient, the lipid made is unbalanced (abnormal). Thus qualitative changes occur in lipids but not in proteins.

What is our optimum requirement for long-chain fats? We do not know. A figure could be derived by comparing the ratio of them to calories in breast milk. Breast milk is rich in polyunsaturated fats, their longchain derivatives, as well as in cerebrosides, - all vital for brain construction. Cows milk, on the other hand, contains only traces of these materials, being rich instead in saturated and mono-unsaturated fats. Nothing of this should be surprising. Breast milk, after all, is for humans. Cows milk is for cows.

Another way of deriving such a figure would be by bearing in mind that for well over 90% of our evolutionary career we have been hunter-gatherers. Hunter-gatherers still survive in beleaguered enclaves in various parts of the tropics, and they still eat wild meat. If we could establish that there is a consistent level and pattern of their consumption, we would go far to discovering how much meat we require for an optimum diet. In the meantime we know that some meat - probably less than we in the West consume today - is essential, but it must be free range.

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Knowledge&Values

by Henryk Skolimowski

Where is the wisdom We have lost in knowledge? Where is the knowledge We have lost in information? T. S. Eliot

What are values? Basically fundamental principles of which the members of a particular society are not willing to compromise. The *a prioris* of its cultural pattern.

It is only in terms of its values that one can understand a society's behaviour. Indeed, if the behaviour of our industrial society is tending towards disaster, it is that its values are aberrant. Yet the examination of values is at present outside the scope of science. Indeed, scientists have no means of examining the validity of those values which provide a justification for the work which they themselves are doing. Like the Light Brigade, "their's is not to wonder why, their's is but to do or die", - clearly an intolerable situation.

To reconcile values and science is one of the priorities of our age. Skolimowski, in this article makes a significant contribution towards this end by tracing the origin and implications of this dichotomy.

1. Some Questions and a Thesis

The sharp separation of factual knowledge from values has been the most momentous and the most perilous event in the intellectual history of the western world. It has been the most momentous because it allowed for the emancipation of the various disciplines from the jurisdiction of and domination by theology and philosophy, each of which invariably contains a specific set of values. This resulted in the emergence and flourishing of natural science, so that a vast knowledge of the physical world was obtained, on the one hand, and considerable material benefits on the other.

It has been a most perilous event, for it necessitated, first, a subtle "purification" from the universe of those elements which were incongruous with the slowly but inexorably evolving metaphor of the world as a clock-like mechanism; and then it necessitated a subtle "purification" from the human

universe of intrinsic values, which were slowly but inexorably subdued to the cause of instrumental values in the unfolding design of progress dominated by the cause of technological efficiency.

Logically speaking, these were two different processes: one, the exploration of the physical world and the growing importance of physical science; and the other, the dwindling importance of traditional human values, or intrinsic values. But this logical separation is highly misleading, for what we witness here is not two different processes but two aspects of the same process. The expansion of physical science and the growing importance of scientific explanations, indeed the growing importance of the physical world, has come about in the wake of the shrinking importance of the realm of traditional values. We are, therefore, justified in suggesting that physical knowledge has been developed at the expense of human values. It would also seem to follow that the resurrection of human values can only be accomplished at the expense of physical knowledge, that is to say, at the expense of the importance of the entire physical world. It would be grossly misleading, indeed a caricature of our position, to suggest that we can trade a bit of physical knowledge for a bit of values. Can you exchange a piece of love for a piece of steak? Such operations are often suggested by systems analysts and other operationalists who talk about pecuniary equivalents of human discomfort and human suffering, which is absurd from a human point of

view.

In order to understand why and how physical knowledge has had an adverse influence on intrinsic values, we must think in terms of global world views and realise that the growing importance of physical knowledge (in a person's world view or in a world view maintained within a given society) invariably intrinsic human values pushes On the periphery. the to maintained within a given society) invariably pushes intrinsic human values to the periphery. On the other hand, the growing importance of intrinsic values and spiritual concerns pushes to the periphery the importance of the Physical Fact and of the entire physical world. This relationship is not a logical one. It does not logically follow that it should be so. But it is a contingent relationship: it has historically happened to be so; and it also has a justification in the structure of our comprehension: we cannot worship equally ardently, without becoming schizophrenic, the deity called Physical Fact and the inner god as expressed by the intrinsic human values.

2. Basic Historical Positions

Historically we can distinguish at least four basic positions regarding the relation of values to knowledge.

The first is the position of classical antiquity as exemplified by Plato: values and knowledge are fused together; one does not become dominant or subservient to the other. As we know, Plato believed in the unity of truth, goodness and beauty. Within his universe values and knowledge are two aspects of the same thing. No knowledge is then value-free; and no values can be regarded as void of knowledge. According to Plato, to possess superior knowledge is to lead a superior life. Knowledge is a vital part of the network of life. Most sins are the fruits of ignorance.

In the Middle Ages we can distinguish the second position knowledge is fused with values, but at the same time it is subordinated to values which are determined by the Church. Knowledge is then in the service of values and must agree with values a priori



accepted as supreme. To grasp God's design, God's order, and the values that follow from this order sometimes required faculties stronger than the mere human intellect, which at times saw discrepancies between natural reason and God's order. Hence revelation was accepted as a mode of cognition, for it allowed one to transcend reason and to find a justification for the fusion of knowledge and values under the supremacy of values.

It would be grossly misleading, indeed a caricature of our position, to suggest that we can trade a bit of physical knowledge for a bit of values. Can you exchange a piece of love for a piece of steak?

The remaining two positions can be clearly discerned in the post-Renaissance period. The third position separates knowledge from values, without, however, giving supremacy to either. This position is perhaps best represented by Immanuel Kant (1720-1804), who clearly saw in Newtonian physics indubitable knowledge governing the behaviour of the physical universe - a separate realm unto itself; but who, at the same time, would not submit the autonomy and sovereignty of man to any deterministic set of physical laws. Hence he summarised the autonomy of both realms by announcing:

"The starry heavens above you and the moral law within."

The fourth position is, of course, the one held by classical empiricism and its more recent extensions: 19th century positivism and 20th century logical empiricism. This position separates values from knowledge and, by attaching a supreme importance to physical knowledge and by ruling that values are not proper knowledge, it ipso facto establishes the primacy of knowledge over values. This tradition is so near to us and envelops so constantly and consistently that we are often unable to see through it so as to assess its impact on us.

In summary, the four basic positions are: Plato – the fusion of knowledge with values without ascertaining the primacy of one over the other; Christianity – the fusion of the two by ascertaining the primacy of values; Kant – the separation of the two without censure of either; empiricism – the separation of values from knowledge while ascertaining the primacy of (factual) knowledge over values.

It is, of course, the empiricist position, or the empiricist tradition that we want to examine in some detail, for this is the tradition that looms largest on our intellectual horizons; this is the tradition that intellectual our has become orthodoxy, the tradition that, so to speak, has been programmed into our ways of thinking and judging, the tradition that has brought the value-vacuum to our society, to our universities, to our individual lives. These are large claims and need to be substantiated. We cannot substantiate them by taking a textbook on philosophy, inspecting the content of empiricist doctrines, and then attempting to determine in what way these doctrines are affecting our lives and our views.

The life of cultures and societies is an exceedingly complex affair. What we must do is to unravel the multitude of causes and effects and then see how the original visions and insights (of Bacon, Galileo, Descartes, etc.) have given rise to larger doctrines, been channelled into various tributaries of learning and life, reinforced and strengthened in process; and how it still feeds upon itself by outlining the

boundaries of its territory and maintaining a rigid control on what is legitimate within the territory and what is illegitimate. To give two specific examples: the research into chemical warfare is "legitimate". for it is an extension of "objective knowledge" into the sphere of "some chemicals"; the research on acupuncture is not "legitimate". because the phenomenon itself seems to undermine more of the fundamental tenets of the empiricist world view. The connection between a particular phenomenon, or a particular strategy, and the basic tenets of the world view is indirect and is usually several steps removed, but it is there, if we have the patience and perseverance to look for it.

As strange as it may seem, this connection is often more readily grasped by intellectually "unsophisticated" rebellious youth than by the "sophisticated" minds that govern present academia. It is rather remarkable that, on the basis of some inner moral feedback, young people can sometimes react with strong moral revulsion, and the certitude of their moral stand, to abuses of knowledge in academia and elsewhere while academia itself seems often oblivious of the fact.

The intellectual tradition which has directly and indirectly caused the value-vacuum has its roots in the 17th century, during which doctrines of Bacon, time the Descartes, Galileo, Newton, Hobbes, Locke, Hume and others were remoulding the world, or rather our picture of it, to make it independent of religion. In the 18th century the centre of gravity moves to France where d'Alembert. Condillac, Condorcet, Diderot, Voltaire. Laplace, Le Mettrie and others furthered the cause of secularism and of the scientific world view. Then in the 19th century the tradition is continued by Auguste Comte in France, Jeremy Bentham and John Stuart Mill in Britain, and by the leading materialists: Feuerbach, Marx, Engels, Lenin. In the 20th century the tradition is further articulated, refined, and couched in a more sophisticated language by Bertrand Russell in Britain and by the logical empiricists of the Vienna Circle.

More recently this tradition has

found its extension in analytical philosophy*, in behaviourist psychology, in operationalised social science (which is to say, the dominant social science), in quantityridden and computer-obsessed political science, and in quite a variety of other disciplines, which are full of Facts and Figures even if these Facts and Figures explain precious little.

To begin with, we have to realise that the state of one's knowledge is an important characteristic of the state of one's being. This is a restatement of the view of knowledge held by Plato, Augustine and Copernicus. This view is still held among primitive societies.

I have sketched the line from Francis Bacon to B. F. Skinner as if it were one uninterrupted, homogeneous development; as if the present predicament were the result of some inexorable logical process. The process was far from homogeneous. What is really startling is the fact that, in spite of a great variety of opposing intellectual forces, the scientific-empiricist world view has prevailed so remarkably.

Quite parallel to the empiricist tradition that has prevailed, there ran and still does run, the other tradition, which for the lack of a better term we shall call antiempiricist. This tradition was represented by minds at least as powerful and superlative as was the empiricist. Pascal, Leibnitz and Spinoza in the 17th century,

*Present analytical philosophy is an embodiment of the positivist ethos, which is based on the cult of technique and the avoidance of problems. Analytical philosophy is not a liberation of the mind (as its practitioners want to insist), but a confinement of the mind in the circus of technical virtuosity. The endless debate over, for example, "sense" and "reference" by "leading philosophers" of the "outstanding intellectual centres", such as Oxford and Cambridge, Harvard and Princeton, Berkeley and Ann Arbor, is a curious spectacle. The same positions, arguments and resolutions have been repeated over and over again during the past 50 years! With Frege and Russell, Lesniewski and Tarski, the creative aspects of the problem have been explored and exhausted. The last 40 years of the debate therefore represents tedious scholasticism resolving itself in pedantic linguistic exercises. The trivialisation of problems and of minds is the price one pays for spurious technical virtuosity.

Rousseau and Kant in the 18th century, Hegel and Nietzsche in the 19th century were all seeking a world liberated from the constraints of scholastic theology, but which would not be reduced to quantity and measure.

Pascal's case is particularly illuminating, for he, more clearly than perhaps anyone else in the 17th century, saw the great value and the great attraction of science and, at the same time, the great danger in unconditional submission to science. He wrote: "Knowledge of physical science will not console me for ignorance of morality in time of affliction, but knowledge of morality will always console me for ignorance of physical science." (Pensées, 23).

Equally illuminating is Spinoza's case. His Ethics - Demonstrated in the Geometric Order is the work in which he argues that the good is everything which furthers knowledge, and vice versa. Happiness consists solely in knowledge. Virtue itself is knowledge. "Happiness is not a reward for virtue, but virtue itself." He further argues that love can be conceived as the perfectibility of man through knowledge, for knowledge induces love - a position not far removed from Plato's. What is most curious about Spinoza's Ethics is that it attempts to prove its propositions as if it were a textbook of geometry. Though profoundly departing from the scientific tradition which later was to prevail, Spinoza paid lip service to it (and more than that), attempting to give geometrical (scientific?) demonstrations to his ethical convictions.

In the 18th century Rousseau and Kant defended, in their respective ways, the autonomy of the human world against the encroachment of the mechanistic world view and the spreading wave of empiricism. Of the two, Rousseau was the flamboyant one, while Kant was the incisive one, Rousseau eloquently, and sometimes dramatically, protested against "civilization", which he thought estranged man from his essence and from his fellow men. The "artificial" ways that civilization imposes on us are at the source of individual and social alienation. This was a prelude to 20th century

outcries against science and technology imposing on us their artificial wavs.

Kant, on the other hand, held that if empiricism is correct, then we do not possess physical knowledge that is certain; if we do possess such knowledge, in the laws of physics, then empiricism (insisting that the sources of this indubitable knowledge are the senses) collapses. Kant felt compelled to conclude that the knowledge of physics provides only the knowledge of the appearances of things, not of "things-in-themselves". Kant held, at the same time, that morality is under complete sovereignty of the human being and is subject to the categorical imperative: "Act according to the principle, which you would like to become the universal law", which has a universal application to all human beings. Knowledge of the moral law is not derivable from physical knowledge; it is peculiar to man's understanding of his place in the universe and of his "duty".

Both Rousseau and Kant created systems which worked against the homogenisation of the world carried on under the auspices of empiricism. They both stood up unflinchingly to the challenge of empiricism. Theirs were imaginative and constructive systems, not merely defensive responses to empiricism. The situation changed in the 19th Then protest against century. spreading materialism and positivism is almost invariably expressed from defensive positions - often from the position of despair, as in Nietzsche and some late 19th century poets.

These brief remarks are intended to show that the empiricist tradition, and the entire world view it has brought with itself, was not something inevitable and inexorable, but that it was rather a peculiar intellectual "strain"; that it prevailed against other traditions; that these other traditions are still alive; that, in particular, the conviction of the unity of knowledge and values was maintained in the 18th, 19th and 20th centuries (particularly among poets); that when we are protesting against the pernicious pitfalls of empiricism and its offshoots, such as logical positivism, we



Locke

are not wolves howling in the wilderness, but heirs of a long and great intellectual tradition.

3. The Eclipse of Values in the 19th Century

Although the advances of natural science in the 17th century were great, the traditional values still prevailed. Newton himself wrote his Principia Mathematica Philosophea Naturalis to attest to the greatness, glory and perfection of God. True enough, empiricists like Locke and Hume were already at work postulating the separation of knowledge from values.

Young people (and not only the young) are lost, confused and alienated because they do not have relevant knowledge to guide them; they do not have a compass, a sense of centre that would make sense of the world around them. Instead they are furnished with bits of information and data, with expertise which they so often find to be irrelevant knowledge.

The 18th century was the period of transition. The slogans of the French enlightenment were both liberating from the tethers of the antiquated religious world view, and at the same time, ominously con straining for they paved the way to vulgar materialism, shallow positivism and the annihilation of values in the 19th century.

The 19th century marks the triumph of science and technology

and the unprecedented spread of the scientific world view. The aggressive assertion of positivism and materialism, of which Marxism was a part; of scientific rationality and technological efficiency; of the age of industrialisation, which, alas, happened to be the age of environmental devastation, were all pointing to a brave new world in which traditional (intrinsic) values are sent to limbo. We need to examine this process more closely in order to understand why the triumphs of science had to signify an eclipse of values.

Science did not develop in a social vacuum but as part of the unfolding new culture. The battle against petrified aspects of institutionalised religion was going on in the 17th and 18th centuries, as well as, and indeed with greater intensity, in the 19th century, which was more aggressive and successful in containing the influence of religion in the realm of thought than was true in the previous two centuries. The secular, rational, science-based world view mounted itself firmly onto the stage. The rest seemed merely a matter of implementation. The time appeared to be near when paradise on earth would prevail.

The battle between science and religion was by no means limited only to intellectual matters, to means of interpreting the world around us. It was also an ideological battle; and it was an eschatological battle, for what was at stake were the ends of man's life. Religion represented the status quo, it was turned inward, it urged man to perfect himself, and to seek the ultimate reward in after life. Science represented the on-going process of change, it was turned outward, and it promised salvation here on earth. In this process religion was often in an alliance with intrinsic values, supported them and was supported by them. On the other hand, science was in an alliance with progress. The corollaries of the two opposing forces of religion and science - intrinsic values on the one hand, and progress on the other - were themselves construed as adversaries. Indeed "progressive" and "revolutionary" individuals of the 19th century debunked with equal vehemence both traditional

religion and traditional values, which they somehow identified with the feudal and bourgeois ethos, thus regarding them unworthy of the new epoch, in which toughness, rationality and a no-nonsense pragmatic attitude were called for.

In this climate intrinsic values were somehow regarded as the vestiges of the obsolete world. It is therefore no wonder that new doctrines concerning values attempted, implicitly or explicitly, to serve the scientific world view and to justify its supremacy. Utilitarianism was the doctrine which announced that the basis for our ethics and action should be the principle: the greatest good for the greatest number. Formulated in this way utilitarianism does not seem to signify the submission of ethics to the dictates of science. However, the principle was soon vulgarised to mean: the biggest number of material goods to the largest possible number of people. This is indeed the underlying ethos of the technological, or consumptive society. Thus we can see that utilitarianism has become an adjunct to material progress, its ethical justification; material progress itself is an essential part of the scientific-technological world view. A scrupulous historian might object that this interpretation does violence to the historical meaning of utilitarianism, as expounded by Jeremy Bentham and John Stuart Mill. Ethical doctrines are what they become in actual practice. The ease with which utilitarianism was "instrumentalised" and integrated into the technological society only shows how much it was attuned to the increasingly homogenised brave new world. After all, Bentham were 19th century Mill and empiricists par excellence. Their views embodied all the limitations characteristic of empiricists.

Nihilism and scientism, on the other hand, overtly preached the gospel of Science, enshrined Facts as deities, and condemned all the products of the human spirit as "meaningless" or reactionary. One of the most striking expressions of this new tough-mindedness is Sergei Bazarov, as drawn by Turgenev in his novel *Fathers and Children*. Bazarov, as we remember, is a robust, exuberant and enthusiastic



believer in science, in materialism, and in the world in which Facts and Positive Knowledge are supreme values. He has no use for art, for poetry, for other "romantic rubbish" Bazarov announces:

"We have decided merely to deny everything."

"And this you call nihilism?" "That we call nihilism."

"Like those artists", said Bazarov, "I consider Raphael to be worth not a copper groat. And for the artists themselves, I appreciate them at about a similar sum."

Utilitarianism was the doctrine which announced that the basis for our ethics and action should be the principle: the greatest good for the greatest number. The principle was soon vulgarised to mean: the biggest number of material goods to the largest possible number of people. This is indeed the underlying ethos of the technological, or consumptive society.

Bazarov is at once an embodiment of the prevailing nihilism, materialism, scientism and positivism which, in their respective ways, regarded intrinsic values as secondary, insignificant, or even nonexistent in the world of cold facts, clinical objectivity and scientific reason.

Now, it takes only a momentary reflection to realise that Bazarov's philosophy has won the day, that big corporations are an incarnation of this philosophy. Bazarovism, if I may coin the phrase, has become the dominant, though implicit philosophy of the technological society - East and West. It requires one sober look to be aware that the Soviet Union is as much dominated by the Bazarovs as is this society. (Is this the reason that the governments increasingly two "understand" each other?) The Mania for continuous economic growth (mistakenly identified with Progress), the enshrined mode of thinking called cost-benefit analysis (mistakenly identified as the most methodology), strenuous valid attempts to operationalise all aspects of human existence (mistakenly called the "rationalisation" of life) are all part and parcel of the same philosophy.

We are training Bazarovs in our academic institutions. Indeed these institutions are set up to train and produce Bazarovs. The problem is severe, for even if we are dimly aware of the fact, we cannot help it: Bazarovism, as an overall social philosophy, has pervaded the fabric of our society and the structure of academia.

A most alarming aspect of the situation is that the Bazarovs still consider themselves "the torch of progress", "the vanguard of humanity", "the remakers of the world for the benefit of all", while in fact they serve the most crass interests of the status quo, are in the vanguard of ecological and human devastation, are the embodiment of conformity and servitude. Within a mere 100 years "revolutionaries" and "progressivists" have become staunch defenders of the status quo. Such a dialectic of history may startle even well seasoned dialecticians. During the last ten years or so the real revolutionaries, who attempted to rekindle our interest in the well being of humanity as a whole, were not the toughminded rationalists, the ones who have been "sweeping aside the rubble of history" to pave new ways, but the "soft-minded" believers in intrinsic values, sometimes mystically inclined, often hostile to science and progress. As a result of these distressing shifts in the meaning of the terms "reason", "unreason", "liberation", and "oppression", liberals do not know what to believe in. They have invested too much in Reason and Progress, which were meant to be the safeguards against oppression and exploitation, while Reason, in the meantime has become a form of oppression and Progress a force of mutilation. Herbert Marcuse has convincingly made the case for this reversal in *One Dimensional Man* and his other writings, so we need not belabour the issue here.

The intellectual climate of the 20th century - that is of the Western economically developed countries - not only favoured the rise and dominance of the Bazarovs. It also somehow inhibited all other individuals from considering values as one of the central concerns of human thought and human life. One of the great misfortunes of Western thought of the last centuries was to link intrinsic values with institutionalised religion. The bankruptcy of one form of institutionalised religion was tantamount, in the eyes of many, to the bankruptcy of religion as such, and of intrinsic values woven into this religion. This identification was based on a faulty Religion, and especially logic. intrinsic values, are not the tools of the clergy to keep the masses in control (though occasionally they are used to such purposes) but are the forms and structures, worked out over the millenia of human experience, through which the individual can transcend himself and thereby make the most of himself or herself as a human being, through which man's spirituality and humanity can acquire its shape and maintain its vitality, through which we define ourselves as self-transcending beings. As such, as I have argued before, intrinsic values outline and define the scope of our humanity.

The climate of the 20th century has anaesthetised us to our own spiritual heritage. Twentieth century philosophy has done little to remedy the situation. Logical positivists have been notorious in manifesting their *insensitivity* to the problem of values. But even outstanding thinkers and well balanced philosophers, such as Sir Karl Popper, who has gained a reputation for being an anti-positivist, offer us precious little. Indeed, it is incredible (if not actually embarrassing) to discern



Wisdom is simply the integration of knowledge with values; it is a demonstration that knowledge is not a futile store of information but a vital force that sustains life on all levels of human existence; it is a resurrection of the universal property of knowledge.

how little Popper has to say about values and how pale it all is. The shadow of positivism has engulfed us all. The value-vacuum has been a necessary outcome of the attrition of religion and the emergence of a secular world-view.

4. Information-Knowledge-Wisdom

Copernicus is often singled out as a divide separating the Middle Ages from modern times. His views on knowledge, however, are closer to Plato and Augustine than to modern empiricists, for all three regarded knowledge not as a repository of facts and information, which one holds in the memory store, but as an intrinsic part of being human. All three thought of knowledge as reality, inseparable from one's acting and one's judging, so that correct knowledge, in the Augustinian sense, is the basis of proper conduct. Even Newton, though considered by empiricists to be their greatest asset, was far from thinking that knowledge was "mere information", irrelevant to or independent from man's other concerns. Newton ex-

plicitly attempted to show the perfection of God through the harmony of his universe, which, he contended, revealed itself through the unity of the laws of physics governing the behaviour of both terrestial and celestial bodies.

Something happened between 1700 and 1900. We divided man into halves. We separated man's knowledge from his essence, from his values, from his transcendental concerns. Knowledge became isolated, put into a special container called brain. This container came to be regarded as a chest of tools: we pick up from this chest this or that tool for the task at hand. There is no longer the unity of man and his knowledge. There are only specialised tools to handle specialised tasks. At this point knowledge becomes mere information. Soon it becomes translated into "bits" of computerised information. The whole process is de-personalised, mechanised, computerised.

The separation of facts from values, of man from his knowledge, of physical phenomena from all "other" phenomena, resulted in the atomisation of the physical world, as well as of the human world. The process of isolation, abstraction and estrangement (of one phenomenon from other phenomena), a precondition of the successful practice of modern natural science, was in fact a process of conceptual alienation. This conceptual alienation became in turn human alienation: man estranged himself from his knowledge and his values. Thus the primary cause of contemporary alienation is a mistaken conception of the universe in which everything is separated and divided and in which the human being is equally atomised and divided.

The present compartmentalisation is unnatural. In order to restore our sanity and to recompose our dividedselves we have to rethink some of the basic premises. To begin with, we have to realise that the state of one's knowledge is an important characteristic of the state of one's being. This is a re-statement of the view of knowledge held by Plato, Augustine and Copernicus. This view is still held among primitive societies, notably among some tribes of the American Indians.

The statement that our knowledge is an important aspect of our being, that as total bio-social organisms we cannot and do not act independently of our knowledge, is not an expression of nostalgia for paradise lost. It is a statement describing the human condition. How can we validate such a claim, particularly in our times when knowledge seems to be so divorced from life? If the integration of relevant knowledge is indispensible for the coherence of one's life, then it simply follows that to deprive people of this knowledge may be the source of confusion and incoherence in their lives. One does not have to be an astute observer to perceive that this is exactly what has happened in the contemporary period. Young people (and not only the young) are lost, confused and alienated because they do not have relevant knowledge to guide them; they do not have a compass, a sense of centre that would make sense of the world around them. Instead they are furnished with bits of information and data, with expertise which they so often find to be irrelevant knowledge.

This is a pathological situation: knowledge does not render enlightenment but confusion: the amassing of information only furthers the process of alienation. The situation is especially pathological because never in the history of mankind has learning (and supposedly knowledge) been pursued on such a vast scale as today, and never has the estrangement of man from the world, and from his fellow man, been greater than today. The cause must lie, then, in the nature of the knowledge we pursue Knowledge alienated from the human mind and human values in turn de-sensitises and alienates people who acquire this knowledge.

But let us be very careful when we say that this knowledge is "irrelevant". For in one sense it is very relevant: it is relevant to the economic system which is mainly interested in the maximisation of profit. It is relevant to the technological society as we have known it. It is relevant to the conception of the world as a factory. The system of economic, ecological and human exploitation is not interested in



knowledge, let alone wisdom. But it is vitally interested in information and expertise; it is interested in its smooth functioning, which is based on technological efficiency. For this reason we furnish our students and ourselves with information and expertise, not with knowledge. For to say it once more, the system designed to perpetuate its exploitive practices is not interested in knowledge relevant to people as human beings. Such knowledge may lead to a profound questioning of the validity of the system. Young people are confused and estranged? The more confused they are the better! This is neither cynicism nor a paradox but a logical consequence of knowledge turned into information, of values turned into economic indices, of people turned into experts. Bazarovs, let us be clear about it, are mere containers of information, "easy tools, deferential, glad to be of use." Bazarovs are very relevant for the maintenance of a system chiefly interested in the maximisation of profit. This is why we inadvertently (or perhaps deliberately) train them in our academies. And how much of the Bazarov has seeped into each one of us? We are not angels, but are as subject to persuasion and manipulation as every other human being. And the forces of manipulation and coercion are great, for great and strong is the material system which they serve.

Let us ask ourselves a most general question at this point. Is there one underlying reason for

this eclipse of values and other pathologies that follow from it? Perhaps the most succinct answer to this question was given by Max Scheler, who said: "To conceive the world as value-free is a task which men set themselves on account of a value: the vital value of mastery and power over things." We realise nowadays thiat this mastery has been an illusion, that we cannot subdue the world to our will without destroying, or at least seriously impairing ourselves, However, we still maintain and perpetuate the system which was designed for this grand, but ultimately pitiful, folly.

There is another general question which should be raised, namely, the question of the relation of theory to practice. The separation of values from knowledge may be seen as an abstract philosophical matter on one level, But this separation is an indispensable part of the process of turning people into Bazarovs, in order to maintain the present consumptive society and the conception of the world as a factory. Let us not complain that there is no relation between theory and practice. There is: ingenious theories have been created and maintained in order to justify and maintain parasitic practices with regard to other people and nature at large. It should be emphasised that the system is equally parasitic on people and nature at large. It is of the utmost importance that we understand the relation between the economic forces of a society and its conception of nature and of the universe, between our daily practices and the outlook on the world we hold. These larger outlooks, or world views, imposed on us subtly and sometimes insidiously, justify and motivate our daily practices. And let us be clear that if we accept the scientific world view with its underlying rationality and its extension – modern technology - we have lost straight away. For this world view generates and justifies: turning knowledge into information, values into economic commodities, people into experts. The perilous aspect of modern science lies in the consequences it has led to, lies in the requirements and demands that it implicitly makes on people and the

eco-system. It is useless to argue that it is not science that did the harm but the people who applied it.' Knowledge is inseparable from people. Science has moulded people's minds to as great a degree as people have moulded science. The twilight of scientific reason, which we are witnessing nowadays, is not necessarily the twilight of humanity. Scientific reason will have to wane and to release us from its overpowering tentacles so that we can restore the strained relation between knowledge and values.

Which brings us once more to the phenomenon of knowledge as an inherent aspect of one's being. This phenomenon manifests itself not only in frustrated and alienated youth, whose knowledge does not guide them because they are filled with irrelevant bits of information, but also in the opposite phenomenon: our veneration of and craving for wise people. Wise people are the ones whose knowledge matters, are those who are in the state of being in which knowledge matters, are the integrated ones, in the sense that their knowledge serves them as human beings. We envy them because it is a state difficult to achieve in the contemporary world. Their wisdom is simply the integration of knowledge with values; it is a demonstration that knowledge is not a futile store of information but a vital force that sustains life on all levels of human existence; it is a resurrection of the universal property of knowledge, which can be seen in all animals and pre-industrial societies, namely the unity of life and knowledge.

The re-integration of knowledge with values will have to take place not in order to make each of us a sage, but in order to assure the survival of humanity. It should be transparently clear to us that we shall not be able to cope with the plethora of problems which the present (scientific-technological) mode of our interaction with nature and other people has originated, until we again arrive at a stage in which our knowledge will matter to us as human beings. This will be a knowledge intertwined with values and at their service. This knowledge will be a re-embodiment, on a new level, of Plato's and

This state of being, which is still maintained in wise people, is something akin to the state of grace. The term "grace" is extremely loaded. All "respectable intellectuals" avoid it. But its past religious connotation should not deter us from making good use of it, for this term makes us clearly aware that to think well is not to think dexterously, ruthlessly, logically: to think well requires a special state of mind and of the entire being. This state of mind needs to be cultivated and nurtured as much as we cultivate - in long years of abstract thinking - the mind geared to "scientific objectivity.'

Need I say that we have a great deal to learn from oriental cultures from the past history of our own civilisation, from primitive societies alive today, in understanding, acquiring and maintaining this state of mind in which "thinking well is a pre-condition of behaving well." To emphasise, what is at stake is not the acquisition of another piece of knowledge - or how "other" societies thought and acted – which we shall append to our existing knowledge, but a change in the structure of our knowledge and in the structure of our mind which will lead, so we should like to hope, to the healing of the valueknowledge split and to the elimination of a great deal of present alienation.

This fundamental change will resolve many specific problems which trouble us daily, such as: how can we know which research to pursue? How do we assess a piece of research, whether it is beneficial or detrimental? The answer to this question (in a simplified form) is: in order to pursue good research we have to pursue good life; we have to think "correctly" in the all-embracing meaning of the term "correctly". This kind of thinking is much more difficult than mere abstract, atomistic, analytical thinking. If it seems

to some as if I were saying that one has to be in a state of grace in order to do good research, they are not far from the truth. For the present mutilation of the world around us, and of other people, goes hand in hand with the attitude of the mind which is graceless, which represents the disinherited mind, the subservient mind, and which is unworthy of the creatures calling themselves human beings.

Should anyone attempt to call this attitude, which we tentatively "grace", a return to precall scientific prejudices, obscurantism or the like, we should reply: why should the state of mind in which abstract entities called "facts" are enshrined as deities be preferable to the state of mind in which intrinsic values are so enshrined? For the state of grace, of which we have spoken, is another expression for the state of mind in which intrinsic values are enshrined. When we say: "the human being - it sounds noble"; "dignity is an essential component of being human"; "freedom is a necessary requirement of the concept of humanity", we in fact "engrace" man. We have to change the world around us, and the frame of our minds, and the structure of our knowledge so that these expressions are not phrases empty of meaning.

Should this discourse strike someone as too philosophical and abstract, and too difficult to implement, let me answer that there are no casy remedies for the present predicament, the present value-vacuum in particular, which we have brought onto ourselves by pursuing certain philosophical abstractions and then fallen victims to. During the past three centuries we have redefined the world around ourselves and these redefinitions resulted in the violation of the world around us, and of ourselves. We have to doubt our previous wisdom; specifically we have to discard a great deal of the "wisdom" of the prophets of material progress, for this progress is leading us to doom. We have to obliterate many spurious dichotomies and distinctions, for they are often at the root of alienation in the present world. Above all, we have to restore the unity of knowledge and values.



ECOLOGICAL LIVING: DREAM OR REALITY?

It's all very admirable but it's nothing but escapism really ...

by Peter Bunyard

... is a common enough reaction towards those fool-hardy souls who have abandoned their salaried jobs, packed their bags and taken themselves off into the country to grab some kind of living from the land. Such critics are essentially right; when a chap from the city chucks up his old lifestyle for ecological living in the country, although he may set off with all the pioneering enthusiasm of an American adventurer, he is definitely running away from something. And the thought of living the rest of my life among noise, fumes, the sprawling ugliness of modern office blocks and my fellow alienated commuters was enough to drive me away in something akin to panic. But the last thing I'd admit to at first was escapism; that seemed negative thinking when a life on the land was to be the new reality, the rediscovery of those life-sustaining forces with which most of us are so much out of touch.

Even before The Ecologist published Blueprint for Survival, the three of us, Robert Allen, Teddy Goldsmith and myself, had discussed abandoning London for the country. The Blueprint aroused such interest that it gave us all the incentive to try and put into practice some of the gospel we were preaching – decentralisation, the rebuilding of community life, shedding the shackles of

industrialisation and trying to live in harmony with nature. An ecological existence was the target.

With lots of prompting from Robert and myself, Teddy came down to Cornwall in 1972, and fell for a 200-acre farm straddling two sides of a pleasantly rolling Cornish valley with the river Ruthern charging hectically along between.

In the two months between Teddy

buying his farm and my buying the 19 acre smallholding next door prices quadrupled, a fact which has certainly determined the extent to which I have been able to establish my farm on "ecological" principles. Indeed many visitors to the farm are disappointed at the dearth of windmills, turbines, solar collectors, composting lavatories, methane generators and other hallmarks of the alternative society. But we are not a charity and none of these low impact technology devices come cheap.

Teddy was soon joined by an old friend, Jeremy Faull, who bought half his farm; the two holdings henceforth being farmed organically as a single 200-acre unit known as Withiel Farms. They were fortunate in inheriting two labourers who worked on the land in the days before tractors, artificials, monoculture and imported feedstuffs for livestock. Alan Eddy, who is now farm manager, tells of the time when, as a kid he rode one of the lead horses in a team of five pulling a binder, and like others of his generation in rural areas he knows what it is to work horses. Alan was given the brief of reducing livestock to a point at which the farm would produce sufficient food for its animals, and to do away with artificials and chemical sprays; that was two years ago when beef prices were rocket high and the usual policy was to increase stock, not to reduce it. The first year was agreat success; the stock was reduced, the arable acreage was increased for home food production, artificials had been eliminated and replaced with small amounts of rock phosphate and a seaweed manure to supplement the farm's own muck, and the makings of a fine South Devon beef herd had been established. And that year the hay and corn were of a quality rarely seen before. This summer of 1974 hardly bears thinking about with scarcely one complete fine day, yet as far as I know Withiel Farms will just about pull through financially which is more than can be said for many farms where they didn't foresee the rocketing costs of feedstuffs, fertiliser and fuel and could never have expected the laughable prices they were going to get in the market for their livestock.

The mechanics of community

Jeremy, Alan and Jos Kendrick working more than 200 acres hardly fits in with one's notion of rebuilding a community on the land. But unless you have masses of supporting capital and are prepared to take a devastating loss how can you change from a highly mechanised farm to one run by an army of diggers? Moreover as soon as you have borrowed money at today's interest rates, as we all have, then you are in the cash economy for better or worse and you can hardly afford to throw open your land for an experimentin community living, especially since accommodation is limited, and you will be unlikely to get permission overnight to put up cottages or whatever for your comrades. Yet at Llawellan we have tried to get a small community going, although it is far too early at this stage to say whether we will succeed.



In getting people together to work the land and farm as a community you have to be prepared even if you put up the capital, to see what is legally yours taken out of your hands and worked according to the ideas and aims of other people. In time, as the place develops, you will definitely yield the right to organise the farm solely in accordance with your own wishes; you have to accept that you are part of a community and that the process of decision must be democratic. I must admit that when I moved to Cornwall I had no set ideas about forming a community, although somewhere in my mind was the aim to show that a small acreage, worked intensively by human and animal labour could be productive, if not more productive than a larger farm in which machines and chemicals have replaced working men and have destroyed the basis of a healthy countryside. And it is worth remembering that in Withiel where we live, only two local men, of which Alan Eddy is one, out of a total of around 60, are still farm labourers; the rest have left the land, most of them for more secure, better paid jobs with English China Clays.

Our community at Lawellan started in a small but irrepressible way, and once begun, got known about on that incredible alternative society

circuit and we have never lacked visitors and potential workers since. Definitely there has to be dedication and commitment on both sides. For my part I have to be prepared to feed and house those who come and if necessary to support financially their projects on the farm if we are agreed such projects are worthwhile. That way we have established a large and ever growing, in all senses of the word, vegetable garden, an orchard, a small apiary, a withy garden, a few acres of arable land, our livestock, equipment for the pony and a tool shed. We have embarked on an ambitious building programme, especially as we try to use local building materials such as stone, cob, slate and even rammed earth. Those who come, particularly those staying for long periods of six months or more, have to appreciate that I have no money to give them in return for their labour. A good part of the money I earn must go on repaying the mortgage and meeting the running costs of the farm. Since it is too early at this stage for the farm to be making money, let alone paying its way, I have to bring in money from outside, which I do by writing and editing. This double highly schizoid role, as part-time writer and farmer carries all sorts of dangers, especially in the eyes of those who are working hard on the land all the time, and who do not know what it is to sit in front of a typewriter.

Comparisons with a Kibbutz

I certainly find it interesting that on most of the kibbutzim hard physical labour enjoys terrific prestige, and on one young kibbutz by the Dead Sea the leaders would work incredibly hard even though the sun was scorching down and we had to break every couple of minutes to gulp down water. In Britain we do not have the advantages offered by the State of Israel to kibbutzim and other agricultural settlements which rent the land at give-away prices and pay diminutive interest on any capital borrowed. Thus, even with only 10 acres per family, when the total land area of a kibbutz is averaged out, the members of today's kibbutzim enjoy a remarkably high standard of living. Some kibbutzim give their members television, hi-fi sets, holidays abroad and other symbols of the modern affluent society. The State of Britain does not look so kindly or beneficially at communities such as that of Lawellan. We



don't guard the frontier nor are we part of a British dream to repopulate the land which was once ours; here we have to sink or swim. One way I think we can swim is if the other members of the community, and we have a long way to go before we have a full complement of people, are able to bring some cash in from outside, especially if they can do so from some activity such as weaving which can be closely associated with the farm. We have to become more like a kibbutz, albeit a small one, which in order to survive economically in Israel has had to incorporate industry along with the farm.

The vegetable garden grows

Our community really began with Pete Dearman who dropped by one very sunny day less than two months after we had moved down. He was about to begin a milk round in Wadebridge some five miles away and was looking for somewhere to stay in the country, where in return for a couple of hours' work each day he would get board and lodging. It seemed worth a try and on that casual basis we moved into the next phase of Lawellan's existence. Pete used to be up by five in the morning and back from his round in the early afternoon. It was really gruelling work and by the New Year Pete decided to pack in the milk round and work full-time on the farm.

We had by that time planted a small vegetable garden at the back of the house but it was nowhere near big enough and Pete, who is a vegetarian, volunteered to begin a much bigger garden elsewhere on the farm. It was entirely his decision where to lay out his plots and he chose a place just the other side of our water mill, which had been gutted of its workings long before our time. In retrospect Pete's choice was a good one. The soil seemed fairly rich and it drained well, even But if self-sufficiency means fleshwhipping self-denial, the creation of crazy taboos, and a closing of doors to the outside world I think the chances of success are dim.

after six weeks' perpetual rain as we had the first part of 1974. Its only drawback is that it is open to the south-west and gale force winds when they blow. We are creating a bank and hedge on the two open sides. The best way to make a wind barrier is to do what the Cornish do: build a dry stone wall, top it with turf and let it form a hedge some three or four foot from the ground. In time a barrier is formed which rises 10 foot or more above the fields. We haven't gone to those lengths, but I think we should when we have more time. It was Pete's idea to dig 70-foot-long narrow strips with the turf prised off for composting, and undug paths in between, from which one could work without trampling down anything growing in the beds. The first year we used old highly seasoned manure which we took from the farm buildings when clearing them out, and this, together with large quantities of rotting hay which were lying uncovered in a large Dutch barn, provided rich organic material for our new garden.

The first year the garden covered about ¹/₄ acre, but by using our two sows to clear the land alongside over the winter we have doubled the size of the garden and we are now selfsufficient in most common garden vegetables, including some less common vegetables such as ruby chard. What I like about the garden is its incredible variety and productivity. Two adjacent rows this autumn contain sunflowers, Jerusalem artichokes, runner beans, gourds, marrows, cucumbers and maize. Except for slugs we have had few problems with pests, certainly not from green or black fly, nor from caterpillars. Dr John Butter, director of Cowley WoodNature Reserve recently stayed with us and was delighted with the small, completely unspoilt area of marshland next to the garden. Apart from some rarer species of butterflies and moths the marsh contained an incredible variety of hover flies, which as John pointed out, are even better controllers of aphids than are ladybirds. Could the siting of our garden next to the wilderness be one of the reasons for our freedom from pests?

Inherent difficulties of traditional methods

If I had known how complicated it is to farm, how many choices and decisions lay before me, how quickly money drains away and how infuriating the weather can be, especially now that the world seems to be plunging into the grips of a new ice age, I would have hesitated a little more before buying Lawellan, but being involved with all the gamble and uncertainties of farming I now know what it is to play more directly with my own fate. It's a fascinating game being my own master and I would not for all the world go back to a life in the town, where basic decisions of existence are taken away from you. One thing's for sure, the more one moves back towards traditional methods of farming and rejects the industrial approach to agriculture, the more difficult farming becomes and the more complicated the decisions. In an ultra-modern, highly mechanised farm the decisions are basically taken from one by the chemical companies, the importers of animal feeds and the manufacturers of farm machinery. Once one treats the soil as little more than a receptacle to hold roots while one pours on the

AIRA FINE GRAIN



requisite quantities of soluble fertilisers, weed killers and pesticides there is little need to think about rotations and the importance of improving soil fertility by choosing the best crops including green manures.

When Pete came to the farm we had a handful of chickens, three geese and one bony goat who gave us just about sufficient milk at the end of a day's nibbling at the overgrowth in our garden. We wanted some cows but we didn't have the money to buy them. As luck would have it, a fellow small-holder was moving from his place to another and needed pasture for his Jersey and two Guernseys over the winter. Feeling that we were now really taking the plunge we accepted the challenge and took in the animals. We created a temporary dairy at the back of the cottage and cleared out a corner of our cowshed. About that time we also bought Susa, a Welsh cob, together with a cart, jingle and harness. We had visions of trotting into Wadebridge for our shopping and gradually making the car obsolete. It took only the first outing with Susa, when she bolted across the field with my wife and the two children hanging on for dear life, to shatter our sweet illusion.

The pitfalls of unfenced fields

On our small farm we wanted to create something of a sanctuary for our animals; the idea was that they should roam more or less unfettered about the place and certainly not be bothered by fences. This was certainly a reaction to animals reared in feed lots and as I see it now was as much an extreme and ignorant view, though at least moral, as is the highly immoral battery farming. In giving our animals a clear run of the farm we had certainly been helped by the previous farmer who had let every hedge, ditch, fence and gate All the rules we create for ourselves, all the taboos are not based on real facts or fundamental truths, but are rationalisations . . .

fall to rack and ruin.

Our pigs, which then consisted of one very hybrid sow, her castrated brother, two lop-eared sows and a boar which we had bought together with Teddy Goldsmith in the mistaken belief that lop-earshad become rare pigs, used to roam more or less where they wanted and as time went on they became increasingly adventurous, on several occasions getting almost to the village a mile away, after nosing their way through several farms. It became embarrassing to get phone calls and then to have to march out with clanging buckets of food to bring them back. We bought pig wire to contain them on the farm but they soon rooted that up and we found ourselves left with two choices: either to keep them in a pigsty all the time, or to find a more effective method of containment in the fields. Loath to pen them in a pigsty we finished up buying a transistorised electric fence and from then on our pigs have been kept confined to areas of land no bigger than ¹/₄ acre.

When pigs are kept on the same piece of land for a period of three months, and they do not have rings in their noses, they clean the land completely of all vegetation. We now use our pigs for that purpose, as well as for eating our waste from the house and the whey from our cheese making. We also keep back a couple of piglets for fattening and once we get the system properly organised we should have a continual supply of meat. It has been claimed that pigs increase soil fertility by 10 per cent or more, and certainly we seem to grow a good crop of vegetables where we had the pigs last autumn. However we have made no measurements and can make no claims of our own.

The longer we stayed on the farm the more we realised the necessity for gates that swung back easily, for fences that kept animals in and for dividing the fields up so that we could make better use of them and grow a variety of different crops. We had acquired more goats, notorious climbers as well as lovers of peas, beans and other favourite vegetables, so they had to be contained. They also tended to tear their udders on fences and brambles and so very reluctantly we began tethering them along the hedgerows where they nibbled everything from docks, brambles, ivy, thistles and hazelnut to plain ordinary grass.

Looking back it is curious to see how we have been forced to change from allowing our animals akind of anarchic freedom to controlling them in a rational way, just as any other traditional farmer would do. In fact the only way to farm without fences on our scale of operation would be to have a full-time swineherd, cowman, goatherd and chicken chaser, and none of us volunteered. One big bonus of dividing the fields up and keeping the animals confined to where you want them is the terrific increase in land use that follows.

Some people – some problems

We had a succession of volunteer helpers coming to the farm and putting up with our chaotic household, as well as adding to the mess themselves. It is incredible how useful many of these helpers have been and what fun we have had with them. I can think of Dave, a London medical student, who with his massive strength helped us drain a part of our marshland and was with us



when we tried to get Susa, wholly unaccustomed as she was, to plough. There were three of us, Pete at the head, me behind the plough and Dave leaning on it to make it bite in the compacted earth. We soon learnt that there is no way you can get a 14-hand Welsh cob on her own to pull a furrow in permanent pasture. Martin, who stayed for six months, had done an engineering apprenticeship, and put his hand to making 5-bar gates, pighouses out in the field, Dutch light frames and indefatigable work on the farm. Willy from Switzerland, came at a critical moment and for one month worked like a slave, helping me make the cottage habitable – and he called it a holiday. Nick who also stayed for six months and looked after the dairy, made hedges, welded broken pieces together and was a tower of strength during harvest. And there were many others, at least 20, including one girl who drew up a lovely map of all the land with the names of all the common grasses and weeds that could be found there. We were all learning all the time and by going to local farm sales we gradually picked up pieces of equipment and tools which have since stood us in good stead: cross cut saws, crowbars, pulleys, chisels, chains, horse whips, harness, harrows, a fiddler for broadcast sowing, hoes, ploughs and bits and pieces for butter making.

But the really big impact on the farm was made by Phil who came by midsummer 1973 and stayed for more than a year, with his girlfriend Beatrice. Apart from being brought up in a home where you learnt to play with a wood chisel, Phil had also done a building course, and it was he who gave us the initiative to embark on all our building programmes without calling in outside workers. Because of Phil I myself have had the courage to build a stone and cob extension to the cottage, lay my own drains, make a bathroom, put up new stairs and make doors and windows. It is great when you haven't had the basic training to feel your confidence grow as you learn to do what once you would have paid others to do for you; what's more you enjoy looking back at the visible manifestations of your mistakes, the shaky line in the stone wall, the far from perfect joinery in the first window frames you ever made, and seeing the gradual but perceptible improvement. In fact you tolerate your own work and that of your friends on the farm in a way you would not if it was hired labour.

For my part I have to be prepared to feed and house those who come ... I have no money to give them in return for their labour.

It has also struck me on innumerable occasions how hard people work — I'm talking about most people who come to the farm, not all when they are working altruistically or at least not for financial reward. It is not rare for people at Lawellan to put m a twelve hour day and still be ready for more the next morning. It is not surprising that the farm has been transformed in two years from a rather ramshackle place to a tidier, better organised, far more dynamic enterprise which has begun to have something of a raison d'etre.

Not only was Phil a vegetarian, he also had strict, almost puritanical ideas about self-sufficiency and being a strong, if at times rather dour character, he imposed his way, for some time at least, upon us all. At that period we all lived in the cottage and it was usual to have up to ten people at the table. Phil supported by Beatrice his girlfriend, who then did most of the cooking decided that we must become self-sufficient in food as soon as possible and that we must make a start right away. In effect this meant that when we were producing insufficient eggs for ourselves, or butter, we had to do without, and since our herb garden was still in its infancy, we had also to do without spicy food. It was an incredible period of self-denial, as well as a period of belligerency against anyone who ate meat, and it led in the

end to Phil and Beatrice moving into a caravan, and to all of us trying to work out in our minds what were the aims of the farm as well as of our own existence. I then began to realise that all the rules we create for ourselves, all the taboos, are not based on real facts or fundamental truths, but are rationalisations in order that we can bind ourselves in a framework and give ourselves identity. Is vegetarianism any more rational than the inhuman, bestial system for churning out meat in battery farms? I have no doubt that faced with a choice between eating battery-produced eggs, chickens, veal and pork or becoming a vegetarian I would choose vegetarianism and denounce the other system. My rationalisation, however is that domesticated animals, if allowed a certain amount of freedom out in the open, optimistically called free-range, do lead bearable lives, and it is fair to kill them for meat. However I would qualify that statement by suggesting that farms should become as self-sufficient as possible in producing feed for their animals and that we should learn to eat a lot less meat than we expect in today's standard of living. That way we would improve farming and our feeding habits and finish up a great deal more healthy than is our present pampered population.

It also became apparent that a life of self-sufficiency which Phil tried to impose both on himself and on the rest of the farm led to all kinds of funny contortions. Phil was upset when I began buying in butter and eggs, even though they were free-range from a local farm, but he was prepared to eat soyabeans and lentils which were both imports into this country. There was also a time when Beatrice refused to cook in pots that she had seen being used for meat, despite the fact that all our pots, being second-hand, had undoubtedly been previously used by a meat-eating family. The worst of our clashes were brought about by the accusation that I was sitting back up at the house or at the "Ecologist" in Wadebridge, neither knowing what was going on at the farm nor contributing to its selfsufficiency. It is undeniably true that if you don't join in the physical work of the farm you very quickly lose the spirit of the place and there was a time when I really felt - or was made to feel - redundant because I wasn't working on the farm. In retrospect, I think the main problem for Phil was that while he had a free hand to achieve what he wanted on the farm, which he did superbly well, he was not true master of the place. Finally, when rancour between us had died down he decided to go and look for his own place, possibly in Ireland. Despite the clashes both Phil and I learnt a lot from this period at Lawellan. He taught himself how to look after the animals, inparticular Susawhom he quietened down in time for the hay harvest when she had to pull banging noisy machinery behind her.

Is self-sufficiency viable?

What is self-sufficiency? When we moved to Llawellan we managed to get the old diesel generator working, although it only did so by belching out black fumes and thumping loudly. It was easy to come to the conclusion that we were against electricity on ecological grounds and except for lapses when I wanted to listen to records - imagine the absurdity of a big diesel engine just to power a record player - the generator remained silent. Even the desire to listen to records dwindled when the turntable speed declined to a wavering 29 rpm instead of 33 1/2. It was a relief when one day the generator refused to work and from then on we have done without electricity.

But being without electricity, whether mains or generated on the premises gives only the illusion of sufficiency. For light at night we use paraffin lamps and it takes only a little thought to realise that the fuel for our lamps is brought in from the big outside world and contributes in no little degree to environmental ills. But in my mind there is a profound psychological difference, an irrational one perhaps, between being hooked up to the electricity mains and through it to a much bigger system which rides roughshod over individuality, and buying in fuel for our lamps as we need it, and the very economic use of these lamps as we carry them from one room to another. Moreover they create a warm atmosphere for chatting, or making music and I feel that by cutting out the ease of electricity we are forced to take better stock of ourselves.

It is nigh impossible to become wholly self-sufficient in modern England and I reckon it must have been very difficult at any period in history. Today we buy in our steel nails manufactured up country, yesterday the local blacksmith made them for us. In neither instance are we self-



sufficient, although nails and similar products made to uniform standards by far-away manufacturers contribute nothing to community life, whereas local blacksmith's do. It

In a community you have to be prepared, even if you put up the capital, to see what is legally yours taken out of your hands.

makes more sense to try and become self-supporting in food, but even then some essentials have to come in from outside, such as salt (though you can in Cornwall go to the seashore and make your own) and it also takes time before the garden and farm have become productive enough to provide you with food throughout the year. But is the object of forming a community to aim at nothing short of self-sufficiency? Such might have been the vague idea when we first moved down, and it was certainly a concept that was being banded around, but if self-sufficiency means fleshwhipping self-denial, the creation of crazy taboos and a closing of doors to the outside world I think the chances of its success are dim. As Pete Dearman told me recently:

"When I first came, the idea of self-sufficiency was marvellous. I know now it's not for me. I feel the co-operation of people is more worthwhile and rewarding; self-sufficiency tends to become insular and destructive". Harsh realities

But lines have to be drawn somewhere, and although we run a Renault van - public transport in Cornwall is a joke – we wanted to avoid using tractors and other motorised machinery on the farm itself. The original idea was that Pete's vegetable garden would be dug and tended by hand with a helping snout from the pigs, and we would use horse-drawn machinery on the rest of the land. But Susa is too small for ploughing, at least on old permanent pasture and we had no intention of turning the farm into a piggery. Reluctantly we have had to have some tractor ploughing done for us, although we have finished off the cultivation ourselves, harrowing the land and sowing rye on about three acres. Another couple of acres of ploughed land we shall leave fallow until the spring and then plant a three-year lay. Mowing is the other problem. You need two large horses at least, to pull a mower and we have therefore had to do most of the cutting with scythes. Although we all enjoy scything it is too slow in this unreliable climate and we have now decided we shall have to buy a small machine.

What we have discovered in the very short time of two years is that farming is a deadly serious game and that economic survival must take precedent over fancy, when that fancy is a non-productive side-line track. The aim is still to work the farm by labour intensive methods but we have learnt that some corners have to be cut just to give us the time to keep up with the essentials and still to be able to press on with improvements. Indeed the continual striving for improvement is the dynamic pulse which feeds enthusiasm, and it is hard going.

A hunter-gardener in Cornwall

Lawellan is a small community within the much looser community formed by Teddy Goldsmith at Whitehay, Jeremy Faull at Bosnieves. Robert Allen who lives one mile away as the crow flies in the middle of a piece of isolated marshy common land, and others who were in the valley before us. Others again have arrived since. Robert came to the country full of his convictions that agriculture was the fallen state of man and that only the hunter gatherer knew how to live in harmony with his surroundings. In tune with his thinking, Robert bought the dilapidated and deserted buildings of an old farm together with a small piece of land. He certainly would not be working his two acres; they would remain wilderness he said staunchly and as if to prove him right that autumn he got a glut of blackberries from the penetrable periphery of his garden. Yet even Robert has had to admit that the ideal nomadic life of the hunter gatherer has its limitations, if you live in 20th century England, and are trying to complete abook. Spurred on by his wife Danni, one of his first tasks was to get his cottage in order. The roof leaked like a collander and one of the outer walls leaned at an angle that would have horrified the inhabitants of Pisa. With help from some stalwart locals and a French boy on holiday Robert managed to get his slates battened down and a buttress worthy of a church against the leaning wall.

Robert's attitude towards life in the country has shifted, as ours has at Lawellan from the idea of a Spartan do-it-yourself existence to one in which one is prepared to accept some of the standards of modern living. He generates his own electricity and like Teddy has become a regular passenger on the London train. He is quite likely to be striding out along the estuary to look at birds, or stumbling across his moorland to study caterpillars during a morning and in the afternoon may be on his way to Strasbourg as a consultant on environmental affairs to the Council of Europe. I find it particularly symbolic of our life in the country that passing within 100 yards of Robert's house – and he is the most isolated of us all – the electricity generating board have recently erected a 400-KV grid line. Indeed the entire length of our pleasant valley has been If I had known how complicated it is to farm, how many choices and decisions lay before me, how quickly money drains away and how infuriating the weather can be, especially now that the world seems to be plunging into the grips of a new ice age, I would have hesitated a little more before buying Lawellan, but being involved with all the gamble and uncertainties of farming I now know what it is to play more directly with my own fate ... I would not for all the world go back to a life in the town.

blessed with these archaic looking superstructures as they strut on their way from Devon to Penzance. The pylons only add to one's gloomy presentiment that there can be no true escape; we are all part of the system, enmeshed willy nilly into its working parts and processed like corn passing through a combine.

The Cheese Barn

One of Teddy's good qualities is the way he enthusiastically presents an idea for others to take over. He had always wanted someone to make traditional cheese and when Tim and Cat Clarke joined the community they decided to do just that. On Bosnieves there was an old tumbledown barn, obviously part of an older farmyard which had fallen into disuse, and here, Tim, together with two and then just one labourer set to and renovated the building, gutting out the inside, rebuilding the stone and cob, re-roofing, plumbing,

SITUATION VACATION

Opportunity to join growing community for experienced (preferably) person/ family to take on responsibility for small dairy herd and care of animals/land using horse and equipment. Contact: Lawellan Farm, Withiel, Bodmin. and laying on a new water supply with the aid of a water diviner. All this had to reach the high standard required for them to be licensed to make cheese. Now 18 months after beginning work on the barn Tim and Cat are marketing their own butter, yoghurt, cottage cheese, a popular pepper-studied, semi-soft full fat cheese, and a herb cheese. Also, after scouting around as far as Wales and beyond they have acquired old vats and presses for making hard cheese and it won't be long before barrels of cheddar are being sold from the "cheese barn".

The Lawrences are another family embroiled with the community. Trevor Lawrence lives on his smallholding opposite Teddy and he is at present doing an incredible conversion on Teddy's cottage which is fast acquiring mansion status. Noone quite knows why Teddy wants such a magnificent extension built onto his cottage but the ultimate aim is to house the Ecologist offices there and any other connected activity such as the Wadebridge Ecological Centre.

cal Centre. Once it was hoped that all connected with Withiel Farms would create a local economy among themselves, not necessarily exchanging money, but bartering one good for another, vegetables for cheese or meat for example. Unfortunately each household has tended to go its own way, and except for social meetings there is all too little contact and discussion. The wider community does not exist in a creative, dynamic way. Nevertheless some useful interaction does sometimes occur. Tim Clarke gives me all the whey from his cheese making and we feed our pigs on it, fattening one up for him as part of the bargain, and another is fattened for Teddy in return for some necessity of life. Pete Dearman from Lawellan and Tim have now got together to marketfood wholesale, throughout Cornwall if the demand is there. The idea is to get orders for basic foods such as flour, oil, lentils, and then once a month to take a van up to London to bring back supplies from the importers. If it works their business will bring in some urgently needed cash creating at the same time contacts throughout a much wider area than Withiel, which might form the basis of a small but useful market system to sell produce off our own farms, including not just agricultural produce, but weaving, pottery, woodwork, and other crafts which I hope one day will be practised at Withiel.



Wind is caused by air pressure differences, that are themselves caused by differential heating, due to the sun. Wind is therefore a direct and contemporary effect of solar energy. As an energy source the wind is as equally inexhaustible as the sun, and its widespread use for human support would equally cause no thermodynamic-climatic problems, due to the wind's inevitability.

WIND SYSTEMS

In a very generalised way the major wind systems of the earth can be shown as in (Fig. 1). In low latitude regions the earth moves faster than the air, so that easterly winds are dominant; at about 30° north and south the air moves at about the speed of the earth, leading to roughly aymmetrical zones of calm (or low wind speed). From 350-500 N and S air masses are moving faster than the earth, leading to two zones of prevailing westerlies. Finally, there are two polar masses of high pressure, that outflow as polar easterlies.

Wind plays a major role in achieving global temperature balances, and an important part of the total energy flow shown in Table 1 is effected by wind. It is important to realise that wind, being more fluid than water, is subject to greater modifications in its local flow patterns. The role of local geomorphology, vegetation, proximity of cities (heat sources), large water bodies, and so on, is therefore very great in deciding the wind regime of a specific point.

However, it is still possible from first principles to indicate certain sites that, in general, should be better endowed with wind than elsewhere. These include: western sides of continents; certain high elevation regions; points along concentrative valley systems. Vegetation can also be used as a 'placer'; where wind is abundant there is often little or no vegetation, or that which there is has adapted to high wind through restricted area, inclination to prevailing winds, and so on.



Fig. 1 Schematic picture of the average winds near sea level that would be found if the earth's surface were smooth and of uniform composition.

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Zones of latitude, deg	Fraction of total area	Short-wave radiation absorbed, cal/cm ² /min (solar)	Long-wave radiation emitted, cal/cm ² /min (heat)	Poleward of trans- port of heat across latitude parallels, *cal/min (wind)
0-20	0,34	0.39	0.3	1. 1. 1.
20-40	0.30	0.34	0.3	57 x 10 ¹⁵ (20°)
40-60	0.22	0.23	0.3	77 x 10 ¹⁵ (40°)
60-90	0.14	0.13	0.3	50 x 10 ¹⁵ (60°)
			dia 22	$[860 \times 10^3 \text{ cals} = 1 \text{ kwh})$
Weighted 1	nean	0.30	0.30	

Table 1. Energy balance.

Limits to Energy Extraction from the Wind

Little work has been done on estimation of maximum possible energy extraction from the wind; however it is certain to be many orders of magnitude less than solar energy, due firstly to supply variations, but also to wind machine technology that inevitably requires many compromises between the goal of maximum energy extraction, and plant costs, location, wind speed variations and so on (see below). The few estimates that exist of maximum extractable wind energy all indicate a yearly total in the region of 1013kWh per year, assuming use of good equipment distributed at the majority of favourable sites. The wind is therefore a very small source of energy by comparison with present human energy consumption, especially in view of the certainty that achievement of a yearly wind energy extraction greater than about 1% of the maximum theoretical, will be impossible.

This is in all probability the reason why use of the wind has been virtually ignored by most nations, especially the industrial ones seeking easily-controlled high energy sources. Another equally-great problem mitigating against the larger use of wind machines in 'advanced' nations is that it is most difficult to construct and operate large scale plant. Wind machines in general are very costly to construct when their output capacity exceeds 10-50kW, and it has been found that very large machines with output powers of more than about 100kW, have not only been inefficient, but have tended to disintegrate in very short periods of time. This has occurred with a large proportion of the few highpowered mills that have been made, and indicate yet another constraint: wind machines plant cost per kilowatt installed has an optimum value at relatively low power. Of course this is an unimportant constraint for the decentrist use of small wind machines, but such is the demand for large plant to satisfy the needs of denselypacked human populations, that it has been an important contributory factor in the abandonment of all but the most limited-scope wind power research.

Translation of Wind Power

Two basic translations underlie the great majority of wind energy: useful energy translations. These are conversion of wind energy to work; and to electricity. It is also possible to use the wind for directly producing heat through friction. There are also many traditional and novel applications in transport.

In high energy economies there is a premium on the production of electricity – because of its flexibility and

transmissability – but as with solar energy there are strong bars against the conversion of wind energy to electricity. Conversion to work energy requires the lowest level of applied technology, is the most costeffective, and is in general the most suited translation in the majority (but not all) of the wind regimes prevailing in the U.K.

Energy in the Wind

There is considerable controversy as to the maximum extractable energy - a controversy that hinges on the behaviour of air parcels around a rotating body. Basically, wind energy must depend on air mass, speed, and the area impinged upon. If we denote the role of air mass by k, and velocity and area impinged on - in like system units-by V and A, then power varies as :k.a.V.X. Because the air mass is acting against a certain area, and is accelerating into it, the relation of power to velocity is found to be cube one. That is, wind energy varies as wind speed cubed. The proportion of k.A. $\sqrt[3]{3}$ available is where controversy comes in : it is between 0.4 and 0.65 of this, depending on the behaviour of air parcels, and more fundamentally on the conceptual basis underlying the analysis. In mks units the factor k is 0.00064 when A is in sq.metres, V is in metres per second, and power extracted is in kilowatts. Using the often-accepted extraction factor of 0.6 the maximum extractable power in kilowatts is therefore: $0.6 \ge 0.00064 \ge AV^3$.

Because of various factors the energy extractable by rotational wind machines is not more than about 60% of this, even for brief periods. Solid, or semi-solid bodies, such as sails, kites and barrages can extract (for periods) a rather larger proportion of the theoretical total, but there are many components in the behaviour of these systems that reduce *overall* extraction below the 60% maximum value used in analysing the behaviour of rotational machines.

Using the stated wind power formula it can be seen that a mill with a swept area of 10 square metres can extract a maximum of about 0.5kW or 500kW in a wind of 5 metres/second. The larger traditional sail mills, with swept areas of 100 square metres or more, could therefore deliver as much as 5Kw in a wind of 5m/ second, defined as Beaufort Scale 3, or a 'gentle breeze'. If we next consider the power in a 'strong breeze', Beaufort Scale 6, we find that a wind of 10m/second can provide 3.8kW through a smaller mill, and 38kW through a mill with a swept area of 100 square metres. A doubling of wind speed has led to a power eight times that available at the lower speed. We can thus see why the wind miller looked wearily at windy days, for he would often have to spend long hours applying leather thong brakes to his mill's shaft, as its power leapt to 50kW (80 HP) or more, and outran the control capacities of the mill machinery.

Where the mill (or sail, barrage, etc.) is providing direct work energy to machinery such as water pumps, grinding equipment, and direct work energy to bodies that are being moved, such as boats the energy provided can be quite a large proportion of the 60% of theoretical total extractable energy. Subsequent conversions, of course, reduce extraction performance, often by as much as one-half. This is for a number of reasons; where electricity is required the wind machine must drive a dynamo or alternator, which requires an approximately constant drive speed. Thus wind energy either below or above the required value is useless, and where axle rotation speeds must be varied and 'smoothed' there is a requirement for power-consuming gears. Over and above such 'mechanical' variables that influence extracted power there is with rotational machines that form the great bulk of all wind machines, a problem related to the design, construction and installation of plant. This 'rating' of plant requires a number of compromises that have a significant effect on extracted power.

Plant Rating – Wind Regimes

Where fixed axle rotation speed are required, above all for electricity production, it is obvious that the closer the mill rotation speed is to the alternator's (or dynamo's) speed requirements, the less will be the need for gearing. This will reduce both inefficiencies and costs. All non-urban sites have wind speed duration frequencies — or wind regimes — similar to (Table 2); high wind speeds for a small proportion of the year, tail-off to a more or less well defined plateau for a large proportion of the year, and an extinction point, which can be sharply-defined, or can fall off gradually. Poor wind regimes are found to be shifted downwards and to the left, and vice versa.

It can be seen that wind machines can be rated to exploit wind situations that fall roughly into three categories; high speeds for short periods; lower speeds for longer periods; combinations of both. Inevitably, the desire is for the last category, an example of the 'cake and eat it' demand! Not surprisingly the plant for this situation has to be (aerodynamically) highly sophisticated, and massively overdesigned for the higher wind speeds. It therefore tends to be costly, clumsy and complex and attempts to produce such equipment have virtually always resulted in failure, economically, and more significantly, in low power extraction at a time instant and low energy extractions over time periods. An excellent example of this kind of costly mistake was the Enfield-Andreau (1950's) wind driven turbogenerator, built at great cost with the backing of the CEGB, that failed to produce more than about one-third of its design power, and was unable to withstand high winds. Other examples include Putman's 'Grandpa's Knob' 1250kW windmill, and the Electrical Research Association's Costa Hill 100kW mill, both of which failed to produce expected quantities of power, and were unstable to the extent that emergency dismantling was required.

Where wind regimes can reliably provide fairly high winds for 1500 hours or more per year, and fall off is not rapid, it may often appear that high rotation speed equipment should be used. Thus mills having aerofoilshape (propellor type) blades can be specified. The choice, however, is rarely as simple as this, for plant rating must consider the alternative wind machine solutions to a mix of factors that not only include wind speed and duration, but economic cost (and capital : maintenance factors) storage, other systems to be operated in association, and technological and logistical factors.

Plant rating to optimise these factors must therefore consider in great detail the types of wind machine that can be used. In effect, the rotational machines fall into three categories, and of these the high speed rotors are unquestionably the most capital and resource intensive, the most sensitive to wind regime variations, and except for the smaller machines, the least reliable.

Mill Characteristics

Probably the most important factor affecting plant rating is the ratio of blade tip:wind speed. This ratio (the: ratio) varies characteristically with the three major types of rotational wind machine. It is found that each type of mill has a maximum power extraction that is strongly controlled by the : ratio, with power falling off very rapidly outside the peak zone.

While multiblade (farm type waterpumpers) mills, and sail mills (traditional grain grinding and waterpumping machines) have low ratios, the peak power extraction of high speed rotors comes in the region of 5.5-6.5, that is that these machines are most efficient when their blades are rotating at about six times wind speed. In a 5m/second wind a 6 metre diameter mill would extract a maximum of about 850W with a shaft speed of: 27.5 x 6/17, or about 90rpm. But if the mill was a sail-type it would extract 850W at a rotation speed of about 32rpm. It is therefore necessary to provide dynamos or alternators (when electricity is required) that are able to function at about the maximum-efficiency point in the output curve, and to design the mill's control features so that the : ratio is optimised. Where it is not possible to provide electricity generators that can operate at the most efficient rotation speed of the mill (at the chosen rating speed) it is necessary to either provide gearing, or to choose two or smaller mills. The gear trains of equipment to raise shaft rotation speeds will of course absorb power, and thus the mill size must be increased (reducing shaft rotation speed at optimum power extraction). Smaller mills, which will rotate faster, will however require power-smoothing ancillary

Beaufort General number description	Const Const	Limits of velocity 20ft. above level ground				
	description	Specifications	m/sec	km/hr	mph	knots
0	Calm	Smoke rises vertically	Under 0.6	Under 1	Under 1	Under 1
• 1	Light air	Wind direction shown by smoke drift but not by vanes	0.6 - 1.7	1 - 6	1 - 3	1 - 3
2	Slight breeze	Wind felt on face; leaves rustle; ordinary vane moved by wind	1.8 - 3.3	7 - 12	4 - 7	4 - 6
3	Gentle breeze	Leaves and twigs in constant motion; wind extends light flag	3.4 - 5.2	13 - 18	8 - 11	7 - 10
4	Moderate breeze	Dust and loose paper; small branches are moved	5.3 - 7.4	19 - 26	12 - 16	10 - 14
5	Fresh breeze	Small trees in leaf begin to sway	7.5 - 9.8	27 - 35	17 - 22	15 - 19
6	Strong breeze	Large branches in motion; whistling in telegraph wires	9.9 - 12.4	36 - 44	23 - 27	19 - 24
7	Moderate gale	Whole trees in motion	12.5 - 15.2	45 - 55	28 - 35	24 - 30
8	Fresh gale	Twigs broken off trees; progress generally impeded	15.3-18.2	56 - 66	35 - 41	30 - 35
9	Strong gale	Slight structural damage occurs; chimney pots removed	18.3-21.5	67 - 77	42 - 48	36 - 42
10	Whole gale	Trees uprooted; considerable structural damage	21.6-25.4	78 - 90	49 - 56	42 - 49
11	Storm	Very rarely experienced; widespread damage	25.5-29.0	91-104	57 - 67	49 - 56
12	Hurricane		Above 29.	Above 104	Above 67	Above 56

Table 2. The Beaufort Scale of Wind Force with Specifications and Velocity Equivalents.

equipment, and of course there will be a need to provide supportive material such as towers, dynamos, mill governors, and so on.

Mill Siting and Commissioning

The choice of aerodynamic (high speed) mills, or sail types, or other types of mill may appear to be the most important factor determining output. However the variables of site choice, and installation details are of equal or greater significance. Mills should be installed as high off the ground as possible; preferably there should be few turbulence-inducing obstructions nearby, such as trees or buildings; cables used should be as thick as possible to minimise voltage drop and power losses; if batteries are used they should be as robust as possible. All these factors add to costs, and are often difficult to achieve for this and other reasons. Therefore the choice of a high-quality mill, well-suited to the local wind regime does not automatically confer good performance if it is casually installed on a roof top or linked with cabling done on the cheap.

Integrating Wind Power

Much more important, on all counts, is how wind power is keyed into energy supply arrangements. As already mentioned, windpower is the most variable renewable energy source, except in certain choice sites. These places of high wind speed and/or constancy are almost invariably remote cutover moors and heaths, of low agriculture value. "Wind farming" could therefore become a distinct and practical use - especially since such places in many nations are already used as 'corridors' for siting electricity grid lines. Breaking down these national scale grids to local area power systems, in the case of grid towers on windy moors, could proceed easily and at low capital cost. The grid towers offer both ready-made mill towers, and at least part of the newly-localised grid system. At this level of wind power use the winter and night time abundance of wind, in many nations, could supplement other renewable energy sources (such as biogas and hydropower) to provide energy for night storage heaters and other heating systems.

Apart from this use of the wind, the other main potential use in local area power systems is at the highly-decentralised level of individual farmsteads and isolated communities. Already, in most nations, there exists a kind of economic incentive for non-central power generation. This is the often high, and rapidly rising cost of connecting consumers to national grids. At present, for many reasons the 'cash comparator' function of this is haphazard and inaccurate, but in planning future local area power systems that utilise renewable energy sources to the full it offers one interesting area for investigation and development. For the economics of evaluating, developing and deploying local area systems is crucial.

At present even order-or-magnitude figures for available wind energy, solar insolation, local stream potential, and so on, are known poorly for large regions, and almost never at the subregional level. It is ironic that vast resources are poured into oil prospecting, despite the acknowledged fact that abundant oil will soon be a thing of the past, whilst investigations into the supply

or renewable energy is mostly done by amateurs in a completely uncoordinated manner. But once we have reliable figures for the supply of wind energy - and other renewable source energy supplies - in a region the economic evaluation of developing potentials for local areas in the most capital and resource-economic way, becomes feasible. For a start, the amount of energy available from these sources can be given a cash value. In the case of wind power, this cash value can form the basis of deciding whether a mill installation should be subsidised or microregional grid supplied by another renewable energy source. Other things being equal, the more remote a site, the more subsidy should be given to developing its wind potential. Since the wind is often most reliable in highly remote regions this suggests that wind energy could come into widespread economic use in these places at an early date.

Conclusion

The wind, rather than be an occasional nuisance or danger, can easily become a dependable supplier of solar energy at one remove. Presently, economic and consumer prejudice are heavily against its wider use. Changing the economics of energy supply by upgrading local area power systems will favour windmill deployment. In certain cases the wind could be 'farmed' to supplement local area grids, but at the most localised level it has probably the greatest scope, as a supplier of electrical, mechanical and thermal energy. Certain novel forms of mill may be developed, but the existing technology is very well proven, and this includes the important wind transport area. However, little is known about supplies of wind energy particularly at the local level. This must become an urgent priority in aiding the best use of non-depletable non polluting energy sources.

REFERENCES: Wind Power. Vol. 7; U.N. Conference on New Sources of Energy, Rome 1961. The Generation of Electricity by Windpower. E. Golding. Spon 1955. Producing Your Own Power. (Ed.) C. Stoner. Rodale Press 1974.

ERRATA (December Issue 1974)

The following mistakes appeared in the article Lead Behaviour & Criminality by D. Bryce-Smith and H. C. Waldron for which we apologise to the authors and our readers.

- P.370. 1.25 should read: airborne lead above 2 ugm.
- P.371. Hyperactivity & Criminality insert should commence: Hyperactivity or hyperkinesis.
- P.376. First column 4 lines from bottom for normal read *abnormal*.
- P.376. Centre column, 12th line. For casual read causal.
- P.376. Centre column, 6th line from bottom for 22 ug read 25 ug.

References: Ref. 125a should read: Repko et al Interim Tech Report No. ITR - 74 - 27. Feb 1974. Niosh Cincinatti.



NAIVE CORRELATION

One of the failings of the inductive principle which underlies the experimental method is that one is not provided with the means of distinguishing cause from effect. If (a) is associated with (b) purely on the basis of empirical correlation, we are making a gratuitous assumption in stating that (a) is causing (b), for (b) might easily have caused (a) or both (a) and (b) might have been caused by (c), or - what is most likely (if they are part of the same complex eco-system) - the relationship between the two, which has led them to appear together, is of so complicated and indirect a nature that it can only be understood by examining the inter-immigration into this country of relationships between several thousand, or even millions of subsystems, among which figure (a) and (b).

The only way to establish cause and effect relationships is by examining different hypotheses in the light of a model of the system involved, i.e. by making use of the deductive method, or, better still its modern version: simulation.

It is quite surprising to what extent totally uncritical correlations backed by no theoretical material of any kind have been allowed to influence public policy in this country. A striking example are the theories of Professor Nicholas Kaldor, developed to explain the slow rate of economic growth in the U.K. during the fifties and sixties, which were the basis of much of the economic policy of the Labour Government during this period.

In fact they provided a justification for: (a) the large scale recent years: (b) the now defunct Selective Employment Tax: and (c) the encouragement of mergers in industry, in particular through the medium of the I.R.C. set up by the Labour Government for this purpose.

Kaldor developed his theory in

the following way: he looked through tables of statistics and found that countries whose economy had expanded rapidly over the last few years had certain things in common, which they did not have with countries whose economy had not expanded. These were:

1) Large scale production; an economist, Verdoorn, linked the rate of increased productivity with the rate of increased output. On the basis of this study, productivity, Kaldor maintained, was the result of large scale manufacturing, not the reverse. If companies were big enough, argued Kaldor, productivity would automatically be increased.

2) Manpower; he showed that countries with a high economic growth recruited their labour force from agriculture. Employment in manufacturing increased to the detriment of that in agriculture. The U.K., he argued, has reached a stage of 'premature maturity' and had no more cheap labour to attract from agriculture.

3) Growth of manufacturing industries; Kaldor remarked that in countries whose economies had expanded, the manufacturing industries, what he called 'secondary occupations', had expanded faster than services, what he called 'tertiary occupations."

On the basis of these three sets of correlations, it became Government policy to create vast industrial giants, to import cheap labour from abroad and to divert labour from service industries into the manufacturing ones.

Anyone vaguely in touch with reality wills simply laugh at the naivety of Kaldor's conclusions. Not so our Government, which swallowed it all – hook, line and sinker. Needless to say, in spite of all the measures taken in the direction indicated, there was no improvement in the rate of growth of British industry.

What is of interest to us here is the methodology used. What Kaldor did was simply to single out a few isolated factors which it was possible to associate empirically with a growing economy in a number of instances too small to constitute a significant sample, and then to postulate that the introduction of these factors into a non-growing

economy would bring about the desired effects.

Needless to say, to build a model of an expanding economy would require taking into account a very large number of factors, most of which would probably not fall within the field of study of present day economics. If one did this, one could either find that the factors noted by Kaldor were irrelevant, alternatively that growth in the countries concerned occurred in spite of them, alternatively that they were the consequence rather than the causes of growth.

Similar uncritical correlations have led Professor Zuckerman to boast of the achievements of modern medicine. Thus he writes:

"The major killing and disabling diseases which used to plague the world – malaria, tuberculosis, poliomyelitis, typhoid, cholera and the simple fevers of childhood like measles and diphtheria – have been eliminated over the past two to three decades in many countries..."

Zuckerman assumes that these trends will last, without having built any model of the conditions that actually determine the outbreak of epidemics and the spread of diseases. If he were to do so, he would probably find that these diseases have not been eliminated at all. Technological solutions have in cases obtained for us a temporary respite, at a very considerable long term cost. Thus a short while ago we were all convinced that venereal diseases had been stamped out in industrial countries; not only is it recurring, but it has become an epidemic with 2.2 million cases in the U.S. last year, and 150 thousand in the U.K.

The same is true of Zuckerman's contention that we shall always be able to feed the world and otherwise accommodate the growing population: statements made entirely on the basis of the ridiculously short experience of industrial society. Also, during the 'Limits to Growth' controversy, Maddox never tired of pointing out as proof of our ability to feed the world the fact that as a result of the Green Revolution, India was actually exporting wheat for the first time in its history. As it happened, the very next year it had to import vast quantities from

America, while a year later it was faced with famine on a massive scale.

Let us consider a few ridiculous examples which might help reveal the inadequacy of current scientific Supposing we methodology. establish that most of the people driving Rolls Royces are chairmen of large companies; on the basis of a naive correlation one could conclude that it sufficed to buy a Rolls Royces ins order to become the chairman of a large company. The behaviour pattern we would then adopt would be no more absurd than that adopted by our Government on the basis of the advice of its 'experts'.

Consider yet another example.

Imagine a man from Mars being invited to watch the Derby at Epsom. Being unable to communicate with his hosts, and never having seen a spectacle of this sort before, he might quite easily come to some very odd conclusions on the basis of empirical correlations.

Thus he would notice that a vast crowd of people was being entertained by twenty-odd horses and twenty very small men in gaily coloured costumes. He might consequently infer that the English had a prediliction for being entertained by very small people. If he did not make the essential, but not all that obvious, connection between the smallness of the men, their lightness and the reduced strain imposed on the horse (a connection



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which cannot be made empirically, but only by building a model of the horse race), he might be led when arranging for the future entertainment of his hosts on Mars to go to great lengths to find diminutive jugglers, conjurors, musicians and dancing girls. Our Martian visitor might easily come to other equally absurd conclusions on the basis of empirical correlations.

For instance, he might notice that those gamblers queuing after a race to obtain their winnings in front of a book-maker's stall wore a very happy, if not jubilant expression on their faces. He might quite easily infer from this that the English had a particular prediliction for queuing and that few occupations would be calculated to confer upon them a greater degree of happiness. This consideration might equally well affect the arrangements he might make for their entertainment.

Once more, if he had built a model of a horse race, and understood the mechanism of betting, he would be able to infer from the happy expression on the faces of the queuers that they had backed the right horse. He would come to the happy conclusion that it is not queuing that renders the English so jubilant, so much as making money on horses.

I think we have every reason to

suppose that the model-building Martian would be capable of organising a more satisfactory stay for his English visitors than the empiricist. His model would enable him to understand the function of the various things he had seen (i.e. the variables of his models would be teleonomic classifications). He would thus be capable of finding substitute entertainment for his English which, although not visitors, empirically similar, would satisfy, e.g. would fulfil, the same psychological functions as the horse race which he may not be able to replicate.

The uselessness of correlations that are not supported by an adequate body of theory, i.e. of conclusions not based on the examination of a situation in the light of an interdisciplinary model, is pointed out by Norman Moore in an article in "Nature". In considering the effects of organochlorine pesticides on bird life he writes:

"The decline in the bird of prey population is noted after the introduction of the chemical and is then attributed to it. If conclusions were based entirely on correlations of this kind, they would have very little value, but if other relevant information is taken fully into account – notably detailed consideration of alternative hypotheses – knowledge of the biology of the species and of the toxicology of the chemical to it or closely related species, one hypothesis can be shown to be greatly preferable to others. In the absence of the crucial experiment this is as far as the scientists can go, but the element of doubt can be extremely small. The situation is a familiar one in ecological research.

There is very good evidence that the reproductive capacity and population size of some birds of prey have been severely affected by organochlorine insecticides. The evidence is accepted by a wide range of workers in many disciplines, and by almost all who have first-hand knowledge of bird populations. No serious alternative hypothesis has been advanced to account for the remarkable phenomena observed in the field."

Unfortunately, our Government experts do not proceed in this way, and the Government has made no move to ban these poisons any more than it has to deal with any of the other real problems which could be shown to face our society were they to be examined in the light of an objective non-disciplinary model of its relationships with its environment.

Edward Goldsmith

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Socialist idealism

THE MILLENNIUM POSTPONED by Edward Hyams. London: Secker & Warburg. £4.00.

It is not without significance that the use of the word "millennium" to mean not just a thousandth anniversary but the start of the age of happiness and benign government, should have first been used in the year 1820. This was the moment, according to Hyams, when the primordial yearning for a Golden Age found a solid basis for switching from past to future.

This Janus-switch began, as Hyams records, much earlier. That man for all seasons Thomas More looked forward to his nowhere (Utopia) almost three hundred years before. He did so in a previous period of steep social and technological change, under the combined impact of science-based discovery and the social upheaval of the first great land enclosure movement. Then, via Godwin, Morelly, Ogilvie and Mabley in the 18th century a combination of Christian teaching and industrial technology began to offer the prospect of a sufficient increase in wealth production to justify the target of a world without want.

The growth of socialist millennialism saw an instant divide in direction as the moral choice opened up between individualist anarchism and "the hive". The Saint Simonians pointed the direction to the managerial society; that extraordinary practitioner of community,

Robert Owen, set practical foundations for today's aspirations to participatory. democracy; Charles Fourier, the mad brilliant synthesist and idealist of *aesthetic* community, tried to encompass both hive and individual in his state of Harmony, in which organic communalism was blended with inequality in a scheme combining lunacy with striking insight.

It was Hegel however who launched the fatal iceberg for millennial navigation, the state. Nor could all the flexibility of his dialectic, that "algebra for revolution", manage the iceberg's successtul circumnavigation. In fact the dialectic proved the siren to the statist rock.

Marx, cautious as to where his dialectic led after the dictatorship of the proletariat, refused the concept of millennium. Proudhorn and his anarchist and syndicalist followers - short sketches are offered of the life and influence of Bakunin, Malatesta and Kropotkin were bolder in their claims for a final happy equilibrium. They avoided the statist iceberg, but at terrible cost in assassinations, imprisonings and the massacres that killed off their cause. Only in Spain did anarchism strike roots and develop a syndicalist political tradition, though the role of the Jura Federation of watch makers and peasant farmers - confounding the modern image of the staid Swiss - offered an example of practical application and inspired a whole brigade of antistate revolutionaries.

Amid present terrorism and upheavals it is salutary to recall in Hyams' pages the socialist turmoils of the 19th century: the Paris Workers' Commune of 1870 and its vengeful putting-down by the Versailles-based government of Thiers, when 20,000 were gunned down in the streets; the strange alliance between the workers' cooperatives of Lassalle and Bismark's embryo national socialism; the "dwarfish but ferocious" Dollfuss, using artillery to destroy a model workers' housing project; the multiple revolts in Italy, Spain, Poland, Greece, Romania, and of course Russia; the role of Bourgeois Brussels and Geneva as revolutionary HQs of Western Europe; the under-

ground journals and workers' syndical movements in almost every European country. Hyams penetrates the purple haze over Victorian expansionism to show a time of hideous hunger, squalor and oppression, of worker desperation, alienation, savagery and heroism.

In today's renewed search for decentralist alternatives, we are reminded of the forgotten figures who - however briefly - put the millennial teachings of their heroleaders into practice, often at the price of their lives - the Otto Bauers, the Jaures. A figure of particular interest to the "fourth world" counter-culture is Pi y Margal, the Spanish translator of Proudhon. Margal added to Proudhon his own ideas on the way to a libertarian society. He planned to rid mankind of the scourge of the State by "dividing and sub-dividing power . . . by making it changeable and progressively destroying it." He proposed "progressive decentralisation, the transfer of power from the nation to the province, from the province to the city municipality, from the municipality ot the parish, to the village and finally to the peasants' and workers' commune." When Margal became President of the Spanish Republic in 1873 he tried to realise his ideas in practice. But his attempt to form a government to abolish government proved absurd. Unable to control its own revolution, his administration was attacked at once from right and left, and he faded fast from the scene.

Bringing the story of socialist idealism and its repression up to date, Hyams offers a useful account of the evolution of the New Left, and the Third World orientation of both its European and American manifestations. Somewhat surprisingly, the impetus behind New Left millennial socialism is, for Hyams, closing circle of planetary the finitude. Pollution, man-made climatic change, increasing competition scarce resources, these are for offered as the new rationale for international sharing in a revival of the anarchosyndicalist ideal. Particularly striking is his socialistically unorthodox preoccupation with population control as a sine qua non for any human feature at all. In a chapter A Possible World?

Hyman spells out his picture of a decentralist global Athenian democracy, with worker co-operatives or communes of 70,000 souls, each with a chance of participating in direct democracy. The principal purpose of this millennium is to achieve socialised global sharing of food and other resources (to each according to his need) in such a way as to avoid Hyam's ultimate social death of bureaucratic managerialism.

It is a glimpse worthy of the utopian tradition which he discusses but cryptically compressed into so short a space as to raise far more questions than it answers. Then confusingly after all that has gone before - comes a chapter announcing that "The Millennium has been Cancelled". All such visions are too late. We are no longer interested in noble aspiration. Our focus is on physical well-being which any competent bureaucracy can provide. Boredom is, for Hyams, the only force that might resurrect millennialism, and this he says is not very likely.

Beaten-down realism or schizophrenia? After recognising the scale of our environmental crisis, why this talk of prospective well-being? What of alienation from our technology (which Hyams does not discuss)? What of our inescapable links with the Third World of which so much was made in the New Left chapter?

Contrary to Mr. Hyams' conclusion it seems that today a growing "international" (not necessarily with socialist antecedants) is convinced that we are engaged in a race between totalitarian technocracy and physical breakdown for the soul of man. If Hyams' socialist millennialists are losing their fight, maybe there are others, less doctrinaire in millennial theology, who are just taking it up. It is a fight that can never be wholly won. And, we must remember, as Gandhi reminded us, not to lose ourselves in "dreaming of systems so perfect that no-one will need to be good." But the new egalitarians, shorter on dogma, anti-statist, anti-bureaucratic and drawing on a wide range of humanist, religious and cultural sources, are matching the New Left in a determination to see the New Order born.

This is a letter written to the President of the United States in 1855, by Chief Seathl (Seattle) of the Suwamish tribe of the State of Washington, regarding the proposed purchase of the tribe's land.

The Great Chief in Washington sends word that he wishes to buy our land. The Great Chief also sends us words of friendship and good will. This is kind of him, since we know that he has little need of our friendship in return. But we will consider your offer, for we know if we do not do so, the white man may come with guns and take our land. What Chief Seathl says, the Great Chief in Washington can count on as truly as our white brothers can count on the return of the seasons. My words are like the stars – they do not set.

How can you buy or sell the sky – the warmth of the land? The idea is strange to us. Yet we do not own the freshness of the air or the sparkle of the water. How can you buy them from us? We will decide in our time. Every part of this earth is sacred to my people. Every shining pine needle, every sandy shore, every mist in the dark woods, every clearing and humming insect is holy in the memory and experience of my people.

We know that the white man does not understand our ways. One portion of the land is the same to him as the next, for he is a stranger who comes in the night and takes from the land whatever he needs. The earth is not his brother, but his enemy, and when he has conquered it, he moves on. He leaves his fathers' graves behind and he does not care. He kidnaps the earth from his children. He does not care. His fathers' graves and his children's birthright are forgotten. His appetite will devour the earth and leave behind only a desert. The sight of your cities pains the eyes of the redman. But perhaps it is because the redman is a savage and does not understand . . .

There is no quiet place in the white man's cities. No place to hear the leaves of spring or the rustle of insect wings. But perhaps I am a savage and do not understand - the clatter only seems to insult the ears. And what is there to life if a man cannot hear the lovely cry of the whippoorwill or the arguments of the frogs around a pond at night? The Indian prefers the soft sound of the wind darting over the face of the pond, and the smell of the wind itself cleansed by a mid-day rain, or scented with a pine. The air is precious to the redman. For all things share the same breath - the beasts, the trees, the man. The white man does not seem to notice the air he breathes. Like a man dying for many days, he is numb to the smell.

If I decide to accept, I will make one condition. The white man must treat the beasts of this land as his brothers. I am a savage and I do not understand any other way. I have seen a thousand rotting buffaloes on the prairie, left by the white man who shot them from a passing train. I am a savage and I do not understand how the smoking iron horse can be more important than the buffalo that we kill only to stay alive. What is man without the beasts? If all the beasts were gone, men would die from great loneliness of spirit, for whatever happens to the beasts also happens to the man. All things are connected. Whatever befalls the earth befalls the sons of the earth.



Brian Johnson



A comment on the Ecology and Religion Conference from Anton Stanislaus who presented the paper on Buddhism.

Dear Sir,

I do appreciate most of your views expressed at the conference on "Ecology and Religion" held recently in London. I do agree with your opinion that what is needed is a religio-cultural resurgence to serve as a control mechanism to prevent the structural collapse of our society. In the face of impending social chaos, as you rightly predict, it can be expected that new messianic movements might emerge offering re-interpretation of But I do wonder the Gospels. whether such movements, forming into splinter sects with conflicting views and ideals, could serve as a strong foundation for "the reemergence of the stable societies of the future."

There are already more than three hundred Christian sects each offering different interpretations of the Bible proclaiming themselves as the propagandists of the true doctrine. Various Jesus movements are springing up in the United States and in Europe seeking spiritual enlightenment through psychedelic drugs and sexual orgies. Recently Time Magazine's religious writer. wrote about a notorious Jesus sect called "The Children of God" whose information centre is in London. Prophesying doom to America, preaching loose sex morals, calling the Libyan leader Gadalfi the saviour of mankind, this aggressive fanatical sect thrives on the money and property appropriated from

their converts. Alarmed American parents accuse the movement's leaders of kidnapping hypnotizing and drugging the youngsters to keep them in their sect.

Apart from these pathological manifestations of the so-called "Jesus Revolution" which attract the disillusioned hippies and disgruntled youth, there are false messiahs prophets and gurus who fatten themselves on the fickle mind. The 16 year-old Guru Maharaj Ji, the spiritual head of the Divine Light Mission, has become a multi-millionaire with millions of followers in Europe and America. His headquarters in East Dulwich. London, are always cramped with thousands of believers, for many of whom he is the "second coming of Christ." Some of his followers were rather confused and disillusioned when Guru Maharaj Ji felt the earthly need to marry his secretary Marilyn Lois Johnson, 24, early this year. A new prophet has suddenly appeared in the West from South Korea calling himself "Master Moon", claiming spiritual authority from Jesus Christ himself. He is Rev. Sun Myung Moon, 54, founder of the Unification Church, reputed to have nearly a million followers all over the world. Speaking at a mass gathering in New York last September, he announced that he communicates with Jesus Christ and other Biblical personalities and had come to the West to reveal the hidden meanings of the Bible.

Along with such "revivals" of Christianity one can also see the emergence of many ancient cults of witchcraft, black magic and other strange occult practices. Recently, in the United States a group calling itself "Morris Cerullo World Evangelism" claimed that nearly 10 million Americans dabble in witchcraft, black masses and other diabolical practices. This claim may be exaggerated, yet this organisation initiated an anti-occult movement to arrest the rising tide of diabolism. We do not know accurately how many people in Britain dabble in occult practices. But one may assume from the recent press reports that many thousands have embraced satanism. The Devil is openly worshipped by some cults. San Francisco takes pride of place in establishing the first Church of Satan. The founder of the Church of Satan Anton la Vey has published a "Satanic Bible" which outsells the Holy Bible in the American University Campuses. Satanism is undeniably a new religious movement in which belief in Christ is replaced by belief in the Devil.

These give some indication of the direction from which new religious movements might arise in the future. I cannot foresee any wide-scale resurgence of Christianity offering a spiritual base for a disintegrating society. In this age of great confusion and spiritual decay, what is needed is not a new religion, nor a revived religion based on the old, but a religious consciousness without religions, without gods, without beliefs in the supernatural.

One can be religious without the aid of a religion, without beliefs in the supernatural. In this sense, religious consciousness is the consciousness of the integrated unity of oneself, others and nature. It is the consciousness of the underlying oneness, wholeness, uniformity that pervade all life. As Jimoh Omo Fadaka has pointed out in his paper "African Traditional Religion" to be religious is to feel harmonious relatedness; experience communion with to others and with nature. Harmonious relatedness is the basis of all human ethics; it is also the law that governs the natural order, the consciousness of which is the true religious consciousness.

A man who respects his fellow beings and reveres his natural environment is a more truly religious person than a man who worships a God symbol for personal salvation. In my view, religious consciousness is the consciousness of nature. Nature is the revelation of harmony order, beauty, goodness; nature is the womb of all life; omnipotent, mysterious and eternal. Nature has all the attributes usually attached to the concept of God. Therefore, contemplation of nature with reverence and love is a superior form of religious meditation to projecting a God phantom in human image for egoistic gains.

The present ecological crisis has its origin in man's alienation from nature, his uprootedness from his natural ties, his break-away from an organic whole in which he was fully and harmoniously integrated. Man's alienation from nature resulted from his invention of a God concept divorced from his synthetic unity with nature. The concept of God as an alien power beyond the vicissitudes of natural law has destroyed the common ground between man and his natural environment bringing about an attitude of total estrangement and hostility towards nature. In the context of the present crisis, what is needed is a religious consciousness without God, a consciousness of nature in place of God. In this sense, to be religious is to return to nature, to regain our lost consciousness of oneness with nature. Nature is our lost paradise. We have to regain it with religious fervour. In this respect The Ecologist is rendering an immense service, a religious service, in re-awakening the spirit of unity, dependence and the inter-related oneness of man and nature. Yours faithfully,

Anton Stanislaus, London S.E.5.

loss of identity

Dear Sir,

It is common knowledge that the state of a civilisation is reflected in its art and architecture; art in our society is almost non-existent and our architecture mainly imitative of previous traditions, with a few notable exceptions. Imitation is caused by a lack of identity, which is partly the result of an educational deficiency and partly the result of being brought up in a society suffering from lack of identity. So the interesting point is how to break away from the vicious circle, because the ratchet of progress won't permit anything that might be seen in progressive eyes as regression, and our society is moving fast towards an age of total lack of identity, where human beings will "think" themselves into all sorts of fantasies, and art will be a curiosity of the past.

An artist when performing his particular art-form is in a state of "creation" with "himself" absent; this is real spontaneity and not imitation, which is the result of attempting to create from preconceptions. It is interesting to note that the further one is removed from nature, the more difficult is this search for identity - hence the crime rates in cities and recuperative effects of holidays in the countryside. It is also interesting that when one has discovered his true identity, whether by negative thinking, art, mescalin, transcendental meditation or whatever, the illusions become apparent in all their comic stupididy, like crows with helicopters and squirrels with nutcrackers, and there is no wish to be anything else but what we are. In this state there is perception, which is the result of looking with an open mind; there are also love, beauty and truth which emanate of their own accord when the mind stops fidgeting. But our society, by advertising, economic growth - "progress" - generally manages to emphasise the "self" by association with possessions, wants, ambitions, until any recognition of our real simplicity, and of what true progress means is impossible. Hope holds a carrot to the future and we chase the illusion of progress through the vegetable garden of life.

Some people hold that religion is the answer; this is patently not true, as any belief puts an end to questions, and it is only by asking that we find out. This is why the prime importance of education is to instil a healthy disrespect for authority and tradition, and a passion for understanding and truth. Far from producing delinquents this type of real education so stimulates the interest that there is no room for the senseless violence growing among present school-children.

However, is there a way to break out of the vicious circle? Now we are perpetuating our idiotic fantasies on the face of the earth in concrete and steel what hope is there for future changes of heart?

Yours faithfully, Peter Schofield, Townshend, Hayle, Cornwall.

P.S. Skolimowski was wrong in saying art comes between man and his environment. Art is the expansion of man's sense of identity with his environment.

The Frelimo decision.

Dear Sir,

It is with great interest I read that the Frelimo government of Mozambique has advocated a "back to the soil" subsistence farming economy much to the indignation of possible foreign investors.

This Frelimo decision, rejecting the Western madness of endless national growth, shows great wisdom. Development benefits the developers rather than the peasant mass which is turned from independent free cultivators into a labour force.

The concept of development is rapid economic growth. This means the use of improved technology, more fertilizers and machinery. That is to say a greater dependence on the developed countries of the West quite rightly described as Neo-Colonialism and the exploitation of those irreplaceable natural resources required by the Western factories if our civilization is to maintain its present standards, which it cannot continue to do indefinitely.

The Third World does not require great projects or machinery that it can neither maintain nor repair without outside help.

It needs small projects that the local inhabitants can build and handle.

An example of this is a 2-man sugar plant I saw in Vietnam where a man brought in a load of cane on his back and went home with the processed sugar.

Small dams. Small scale fish ponds. Mills worked by ox-power.

Our Western worship of the N.G.P. is a form of madness that can only lead to ecological disaster. Modern agriculture with its huge monoculturers is not even efficient. A greater quantity of food per acre can be produced by the peasant small-holder who constantly improves the quality of his soil instead of destroying its structure by the use of heavy machinery and an ever increasing input of fertilizers and pesticides that kills it.

If the Frelimo stick to their principles they may succeed in feeding themselves and at the same time retain their native culture.

The Frelimo have in fact taken a most ecologically sophisticated

stand. The first nation in the world to have done so.

There is no need to develop natural resources such as minerals and timber just because they are there.

Stuart Cloete

Hermanus, S.A.

Ecological Politics.

Dear Sir,

Personal contacts and canvas experience both confirm that the great majority of the ecologically minded believe that a new party is unnecessary because the Liberals are likely to become the "no-growth" party quite soon. There is now psephological evidence pointing to the same conclusion: in the two 1974 elections there were 9 candidates on a "no-growth" platform (7 of them PEOPLE) who were competing with Liberals. Their average poll was 411, but the 3 (2 PEOPLE) in February who did not face Liberals polled an average of 1,370 - slightly better than the National Front overall average! In two seats a direct Lib no Lib comparison is possible. In Birmingham Northfield the "ecological" vote fell from 1,237 to 359 on Liberal intervention, and in Coventry North-West from 1,542 to 313.

Unfortunately for the Liberal "steady-staters" this means that provided PEOPLE can be starved of publicity, their party has nothing to gain by adopting such a stance. But canvass experience also suggests that as yet at least 85% of the electorate actually disagree with our approach, so that the Liberals could have a great deal to lose pending a process or public education which they have no option but to hamper. PEOPLE on the other hand can play an important part in explaining to the man in the street that an ecologically sound society will be preferable in many ways.

It is possible that the missing 1,000 votes per seat were merely protest votes. Indeed, in 7 seats where the National Front faced a Liberal in October but not in February, their average fell from 2,783 to 1,822! On this assumption however there is even less for the Liberals in eco-politics, quite apart from the problems of putting new wine in new bottles. (Will they expel John Pardoe, or will he go quietly I wonder?)

Perhaps the time is not quite ripe for an ecological party in the full sense of the word, but there remains a pressing need for an "ecological government" pressure group. The two need differ only in the way that a man differs from a boy. Pending a full discussion on strategy, I must point out that these views are my own, not necessarily those of the party as a whole. Yours faithfully, Clive R. Lord, National Secretary, PEOPLE

The need to ban advertising.

Dear Sir,

May I make three points about Peter Abbs' excellent article on the psychological and cultural damage inflicted by advertising? First, a modest proposal that we should designate the graphic art of the advertiser "capitalist realism" by analogy with "socialist realism". Both serve the function of ideological and cultural conditioning, and the term draws attention to this parallelism, and also to the tainted values beneath their slick surfaces. Second, a plea that the notion of "esurience" (the feeling of a desire for some consumer good) be restored to the everyday vocabulary of economics. It is apparent that "welfare" may be as effectively increased by reducing esurience as by augmenting consumption, and the removal of most advertising would play a most helpful part to that end.

This brings me to my last point. Mr. Abbs, after an incisive diagnosis, offers the hope that the better teaching of English in schools will remedy the ills created by this multi-million-pound industry. With the greatest of respect to the author, and to teachers of English, this is nonsense. Much stronger medicine is needed. We need to ban advertising by law, excepting only the simplest informative kind. Even from an economic crisis, torment ourselves by buying things for which we should otherwise feel no need?

The details of a sensible ban on advertising would need an article rather than a letter; and I would like to invite you, sir, or Mr. Abbs to provide us with such an article. It is my suspicion that this seemingly simple legal prohibition could trigger a remarkable series of changes both in the behaviour of firms and in the perceptions of society, almost all for the better. Would you agree? Yours faithfully, Mark Elvin,

The Oriental Inst., Oxford.

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