



The Role of Culture in the Struggle for Independence Interview with Dr. Sicco Mansholt 

Peter Kropotkin-The Anarchist Prince



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# Comments

#### How to live in cloud cuckoo land and justify it

Researchers have made the amazing discovery that there is plastic waste in the sea. Since in the UK alone we consume 1.5 million tons of plastic per year, and since our principal method of getting rid of all waste products is to consign them to the nearest waterway or dump them in the sea, one would not have expected that this would have caused quite so much astonishment.

Our researchers have also suddenly noticed with equal astonishment that our beaches are covered with oil and that our coastal waters are polluted with sewage. Why this astonishment? Most of the waste oil from our garages and industrial installations ends up in rivers. Tankers, in ever increasing numbers, clean out their holds and where else can the waste oil go? Also, half burnt hydrocarbons from, among other things, 200 million motor car engines are released into the atmosphere and returned to the surface of the planet, two thirds of which is made up of the oceans. So massive quantities of oil must end up there, at least 10 million tons of it every year (according to the SCEP report), possibly very much more. The only other possibility is that some great benign fairy in the employ of the petrol companies just lifts her magic wand and wafts it away to another planet!

So, too, with sewage; the excrement from 3.7 billion people finds its way into the world's rivers and seas. I suppose people believe that "natural" processes will break it down. They forget that it isn't "natural" to have 3.7 billion people on a planet designed for probably no more than 30 million, and that the bacteria that normally decompose human excrement are grossly overworked.

We are also astonished at the growing cancer rate; yet there is an exponential increase in the number of chemical carcinogens the population is subjected to in the form of food additives and contaminants in the air and water, and also in the radiation levels it is subjected to. According to the Who Chronicle: "The 'annual rates' of increase in the number of x-ray examinations in technically advanced countries... is estimated to lie between 5 per cent and 15 per cent", which means that exposure is doubling every 5 to 15 years. Radiation is the best documented carcinogen there is. Yet a single dental x-ray gives us, in less than 1/100th of a second, between 10 and 20 times the radiation we obtain in a single year from natural sources. It makes one consider just how many cancers are being caused by the army of 6,000 radiographers employed in this country alone!

We are astonished at the increasing social chaos; at the crime, the delinquency, the drug addiction, the alcoholism and all the other symptoms of social disintegration—but we are doing everything possible to promote it. By promoting mobility on the present scale we make it impossible for the necessary bonds to develop to hold communities together. By forcing people into vast anonymous conurbations, we are creating an environment in which neither the family nor the community can hope to survive.

Finally we are astonished at the increasing rate of inflation. Yet our Government is methodically fostering it. Government expenditure on expedients to counteract the biological, social and ecological side-effects of the industrial processes, is increasing everywhere faster than GNP. At the rate we are going, the cost of the National Health Service alone will absorb the whole of the GNP within the next century: the cost of education even sooner. Thus there will be increasingly less money to pay for the goods we associate with a high standard of livingand the cost of plastic buckets and electric toothbrushes will escalate.

In addition, we are running out of practically all the resources needed for industrial processes, and far faster than we ever predicted it.

How do we react to these problems? The answer is—as if they didn't exist. "Experts" are hired to underplay their seriousness, while our Governments' sole preoccupation remains to stay in office as long as possible, regardless of the cost to society.

Consider Mr Healey's recent minibudget. He makes no effort to reduce the gross overspending of local governments which has led to the present steep rise in rates. Instead he prefers to subsidise rates so as to ingratiate himself with the Local Authorities and the ratepayers.

He makes no effort to reduce our absurd overconsumption of petrol and other consumer products, for that matter. Instead, so as to ingratiate himself still further with the electorate, he has chosen to subsidise consumption by reducing the tax on petrol and VAT on consumer goods.

He makes no move to reduce massive Government expenditure which is the most obvious of all the causes of inflation in order to finance this gross selfindulgence. Instead he borrows, for this purpose, £500 million from the Shah of Iran, thereby further worsening our financial situation.

By encouraging spending by Government, Local Authorities, and the consumer at large, inflationary pressures have been directly increased. The expected 1 per cent fall in the cost of living is but a subterfuge, a gimmick of the most despicable nature designed to obtain votes and nothing more, quite apart from the fact that its "beneficial" effect, in a year in which inflation is likely to be between 20 per cent and 25 per cent, will be felt by the pampered consumer for no more than a few weeks at the most.

The truth is that we already possess all the information we need to guide public policy on such matters as pollution, degenerative disease, crime, delinquency, inflation and all the other problems that beset our society. *If we do not use this information, it is because we cannot face its implications*, for it would mean abandoning the present goals of our society and moving in a very different direction.

The plea of ignorance and the chorus of demands for further research in practically all these fields, *are but a feeble attempt to avoid facing reality*, to justify the maintenance of our society along the present catastrophic course, in the interests of the petty, personal, short-term "benefits" that this might bring to the totally irresponsible leaders of our increasingly degenerate society. *Edward Goldsmith* 



The Role of Culture in the struggle for Independence

by Amilcar Cabral

AMILCAR CABRAL was the leader of the PAIGC (African Party for the Independence of Guinea and the Cape Verde Islands). He was a quite remarkable man with a profound understanding on basic social issues. In this article he shows how a society's most valuable possession is its culture, and how the most devastating effect of Imperialism has been its destruction of local culture. The re-establishment of traditional cultures is thus one of today's priorities.

The struggle of peoples for national liberation and independence has become a tremendous force for human progress and is beyond doubt an essential feature of the history of our time.

Objective analysis of imperialism as a fact or historical phenomenon that is "natural", even "necessary" to the economic and political evolution of a great part of man-kind, reveals that imperialist rule, with its train of misery, pillage, crimes and its destruction of human and cultural values, was not a purely negative reality.

The huge accumulation of capital in a half dozen countries of the northern hemisphere as the result of piracy, sack of other people's property and unbridled exploitation of their labour, did more than engender colonial monopoly, the sharing-out of the world and imperialist dominions. Aided by the accelerated progress of science and



technology, it profoundly transformed the means of production, stepped-up the social organisation of work and raised the standard of living of vast sections of the population.

In the colonised countries, colonisation usually arrested the historical development of the people when it did not lead to their total or gradual elimination. Here imperialist capital imposed new types of relationships within the indigenous society whose structure became more complex. It aroused, fomented, inflamed or resolved social contradictions and conflicts.

With the circulation of money and the development of the domestic and foreign markets, it introduced new elements into the economy. It led to the birth of new nations out of ethnic groups or peoples at varying stages of historical development.

#### **Imperialist Rule**

The practice of imperialist rule demanded a more or less accurate knowledge of the people dominated and their historical background (economic, social and cultural). This knowledge is necessarily expressed in terms of comparison with the dominating power's own historical background.

Such knowledge is a necessity for imperialist rule which results from the usually violent confrontation of two different identities, distinct in their historical backgrounds and antagonistic in their functions. The search for such knowledge contributed to the general enrichment of the human and social sciences.

Indeed, man has never shown such

interest in learning about other men and other societies as during this century of imperialist domination. An unprecedented amount of information was thus accumulated concerning subjugated peoples or ethnic groups, especially in the fields of history, ethnology, ethnography, sociology and culture.

Concepts of race, caste, clanship, tribe, nation, culture, identity, dignity and many more besides have received increasing attention from those who study man and the so-called "primitive" or "evolving" societies.

More recently, with the upsurge of liberation movements, it has been found necessary to analyse the characteristics of these societies in terms of the struggle that is being fought, so as to determine which factors spark off or restrain this struggle. Researchers generally agree that, in this context, culture takes on special importance. Any attempt to throw light on the true role of culture in the development of a liberation (pre-independence) movement can be seen as making a helpful contribution to the general struggle of peoples against imperialist rule.

Because independence movements are as a rule marked even in their beginning by increased cultural activity, it is taken for granted that such movements are preceded by a cultural "renaissance" of the dominated people. Going a step further, culture is regarded as a method of mobilising the group, even as a weapon in the fight for independence.

From experience of the struggle of my own people and it might be said of all Africa, I feel that this is a too limited, if not erroneous, conception of the vital role of culture in the development of liberation movements. I think it comes of generalising incorrectly from a real but restricted phenomenon that appears at the level of colonial elites or diasporas. Such a generalisation is unaware of or disregards an essential factor—the indestructibility of cultural resistance by the mass of the people to foreign rule.

#### Failure of "assimilation"

With a few exceptions, the era of colonisation was too short, in Africa at least, to destroy or significantly depreciate the essential elements in the culture and traditions of the colonised peoples. Experience in Africa shows that (leaving aside genocide, racial segregation and apartheid) the one socalled "positive" way the colonial power has found for opposing cultural resistance is "assimilation". But the total failure of the policy of "gradual assimilation" of colonised populations is obvious proof of the fallacy of the theory and of the peoples' capacity for resistance.

On the other hand, even in settlement colonies, where the overwhelming majority of the population is still indigenous, the area of colonial and particularly cultural occupation is usually reduced to coastal strips and a few small zones in the interior.

The influence of the colonial power's culture is almost nil outside the capital and other urban centres. It is only significantly felt within the social pyramid created by colonialism itself and affects more particularly what may be called the indigenous petty bourgeoise and a very limited number of workers in urban centres.

We find then that the great rural masses and a large fraction of the urban population, totalling over 99 per cent of the indigenous population, are virtually isolated from any cultural influence by the colonial power. This implies that not only for the mass of people in the dominated country but also for the dominated classes among the indigenous peoples (traditional chiefs, noble families, religious leaders) there is usually no destruction or significant depreciation of culture and traditions.

Repressed, persecuted, humiliated, betrayed by certain social groups which have come to terms with the foreigner, culture takes refuge in villages, in forests and in the minds of the victims of domination, weathering all storms to recover all its power of expansion and enrichment through the struggle for liberation.

That is why the problem of a "return to the source" or a "cultural renaissance" does not arise for the mass of the people; it could not, for the masses are the torch-bearers of culture; they are the source of culture and, at the same time, the one entity truly capable of creating and preserving it, of making history.

For an accurate appreciation of the true role of culture in the development of the liberation movement, a distinction must therefore be made, at least in Africa, between the situation of the masses who preserve their culture and of the social groups that are more or

#### The indigenous lower middle class

Even though marked by certain cultural features of their own indigenous community, native élites created by the colonising process live materially and spiritually the culture of the colonialist foreigner with whom they seek gradually to identify themselves in social behaviour and even in their views of indigenous cultural values.

Over two or three generations at least under colonisation, a social class has been formed of government officials, employees in various branches of the economy (especially trade), members of the liberal professions and a few urban and agricultural landowners. This indigenous lower middle class, created by foreign rule and indispensable to the colonial system of exploitation, finds itself placed between the mass of workers in the country and in the towns and the minority of local representatives of the foreign ruling class.

Culture has proved to be the very foundation of the liberation movement. Only societies which preserve their culture are able to mobilise and organise themselves and fight against foreign domination.

Although its members may have more or less developed relations with the mass of people or the traditional chiefs, they usually aspire to a way of life similar to, if not identical with, that of the foreign minority. Limiting their relations with the masses, they try to become integrated with that minority, often to the detriment of family or ethnic bonds and always at personal cost.

But despite apparent exceptions, they never succeed in crossing the barriers imposed by the system. They are prisoners of the contradictions of the social and cultural reality in which they live, for they cannot escape their condition as a "marginal" class. This marginality is the real social and cultural drama of the colonial elites or indigenous petty bourgeoisie. While living conditions and level of acculturation determine its intensity, this drama is always lived at the individual, not the community, level. Within the framework of this daily drama, against the background of the usually violent confrontation between the mass of the people and the ruling colonial class, a feeling of bitterness grows among the indigenous lower middle class. At the same time, they gradually become aware of an urgent need to contest their marginal status and to find an identity. So they turn towards the other pole of the social and cultural conflict in which they are living —the mass of the people.

#### The "return to the source"

Hence the "return to the source" which seems all the more imperative as the sense of isolation and frustration of this lower middle class grows. The same holds true for Africans dispersed in colonialist and racist captials.

It is not by chance, then, that theories or movements such as Pan Africanism and Negritude (two pertinent expressions based mainly on the notion that all Black Africans are culturally identical) were conceived outside Black Africa. More recently, the Black Americans claim to an African identity is another, perhaps desperate expression of this need to "return to the source" though it is clearly influenced by a new factor—the winning of independence by the great majority of African peoples.

But the "return to the source" neither is nor can be in itself an act of struggle against foreign (colonialist and racist) rule. Nor does it necessarily mean a return to traditions. It is the denial by the indigenous petty bourgeoisie of the superiority claimed for the culture of the ruling power over the culture of the dominated people with which this petty bourgeoisie feels the need to identify.

This "return to the source", then, is not a voluntary step; it is the only possible response to the irreconcilable contradiction between the colonised society and the colonial power, between the exploited masses and the foreign exploiters.

When the "return to the source" goes beyond the individual to find expression in "groups" or "movements" this opposition turns into conflict (under cover or open), the prelude to the pre-independence movement or struggle for liberation from foreign voke.

This "return to the source" is thus

historically important only if it involves both a genuine commitment to the fight for independence and also a total, irrevocable identification with the aspirations of the masses, who reject not only the foreigner's culture but foreign rule altogether. Otherwise it is nothing but a means of obtaining temporary advantages, a conscious or unconscious form of political opportunism.

It should be noted that this "return to the source", whether real or apparent, is not something that happens simultaneously and uniformly within the lower middle class. It is a slow, discontinuous, uneven process, and its development depends on each person's degree of acculturation, material conditions of life, ideological thinking and individual history as a social being.

This unevenness explains the splitting of the indigenous petty bourgeoisie into three groups in relation to the liberation movement; a minority which even though it may want the end of foreign rule, hangs on to the ruling colonial class and openly opposes the liberation movement in order to defend and secure its own social position; a hesitant or undecided majority; another minority which helps to create and to direct the liberation movement.

But this last group, which plays a decisive role in developing the proindependence movement, does not really succeed in identifying itself with the mass of the people (with their culture and their aspirations) except through the struggle, the degree of identification depending on the form or forms of the struggle, the ideological content of the movement and the extent of each person's moral and political awareness.

#### Culture and foundation of liberation

Culture has proved to be the very foundation of the liberation movement. Only societies which preserve their culture are able to mobilise and organise themselves and fight against foreign domination. Whatever ideological or idealistic forms it takes, culture is essential to the historical process. It has the power to prepare and make fertile those factors that ensure historical continuity and determine a society's chances of progressing (or regressing).

Since imperialist rule is the negation of the historical progress of the dominated society, it will readily be under-



stood that it is also the negation of the cultural process. And since a society that really succeeds in throwing off the foreign yoke reverts to the upward paths of its own culture, the struggle for liberation is above all an act of culture.

The fight for liberation is an essentially political fact. Consequently as it develops, it can only use political methods. Culture then is not, and cannot be, a weapon or a means of mobilising the group against foreign domination. It is much more than that.

Since imperialist rule is the negation of the historical progress of the dominated society, it will readily be understood that it is also the negation of the cultural process.

Indeed, it is on firm knowledge of the local reality, particularly the cultural reality, that the choice, organisation and development of the best methods of fighting are based.

This is why the liberation must recognise the vital importance not only of the cultural characteristics of the dominated society as a whole but also of those of each social class. For though it has a mass aspect, culture is not uniform and does not develop evenly in all sectors, horizontal or vertical, of society.

The attitude and behaviour of each class or each individual towards the struggle and its development are, it is true, dictated by economic interests, but they are also profoundly influenced by culture. It may even be said that differences in cultural level explain differences in behaviour towards the liberation movement of individuals of the same social class.

It is at this level, then, that culture attains its full significance for each individual—comprehension of and integration within his social milieu, indentification with the fundamental problems and aspirations of his society and acceptance or rejection of the possibility of change for the better.

Whatever its form, the struggle requires the mobilisation and organisation of a large majority of the population, the political and moral unity of the different social classes, the gradual elimination of vestiges of tribal or feudal mentality, the rejection of social and religious taboos that are incompatible with the rational and national character of the liberating movement. And the struggle brings about many other profound modifications in the life of the people.

This is all the more true because the dynamics of the struggle also require the exercise of democracy, criticism and self-criticism, growing participation of the people in running their lives, the achievement of literacy, the creation of schools and health services, leadership training for rural and city workers and many other achievements that are involved in the society's "forced march" along the road of cultural progress. This shows that the liberation struggle is more than a cultural fact, it is also a cultural factor.

#### Reaction of the colonial power

Among the representatives of the colonial power as well as in their home countries, the first reaction to the liberation struggle is a general feeling of surprise and incredulity. Once this feeling, the fruit of prejudice or of the planned distortions typical of colonialist news, is surmounted, reactions vary with the interests, the political opinions and the degree to which colonialist and racist attitudes have crystallised among the different social classes and individuals.

The progress of the struggle and the sacrifices imposed by the need to take colonialist repressive measures (police or military) cause a split in metropolitan opinion. Differing, if not divergent, positions are adopted and new political and social contradictions emerge.

From the moment the struggle is recognised as an irreversible fact, however great the resources employed to quash it, a qualitative change takes place in metropolitan opinion. The possibility, if not inevitability, of the colony's independence is on the whole gradually accepted.

Neo-colonialism is, above all, the continuation of imperialist economic rule in disguise, but nevertheless it is also the tacit recognition by the colonial power that the people it rules and exploits have an identity of their own demanding its own political control, for the satisfaction of a cultural necessity.

Such a change is a conscious or unconscious admission that the colonised people now engaged in the struggle have an identity and a culture of their own. And this holds true even though throughout the conflict an active minority, clinging to its interests and prejudices, persists in refusing the colonised their right to independence and in denying the equivalence of cultures that right implies.

At a decisive stage in the conflict this equivalence is implicitly recognised or accepted even by the colonial power. To divert the fighters from their objectives, it applies a demagogic policy of "economic and social improvement" of "cultural development", cloaking its domination with new forms. Neocolonialism is, above all, the continuation of imperialist economic rule in disguise, but nevertheless it is also the tacit recognition by the colonial power that the people it rules and exploits have an identity of their own demanding its own political control, for the satisfaction of a cultural necessity.

Moreover, by accepting that the

colonised people have an identity and a culture, and therefore an inalienable right to self-determination and independence, metropolitan opinion (or at least an important part of it) itself makes significant cultural progress and sheds a negative element in its own culture—the prejudice that the colonising nation is superior to the colonised one. This advance can have allimportant consequences for the political evolution of the imperialist or colonialist power, as certain facts of currrent or recent history prove.

If culture is to play its proper role, the liberation movement must lay down the precise objectives to be achieved on the road to the reconquest of the rights of the people it represents —the right to make its own history and the right to dispose freely of its own productive resources. This will pave the way to the final objective of developing a richer, popular, national scientific and universal culture.

It is not the task of the liberation movement to determine whether a culture is specific to the people or not. The important thing is for the movement to undertake a critical analysis of that culture in the light of the requirements of the struggle and of progress; to give it its place within the universal civilisation without consideration as to its superiority or inferiority, with a view to its harmonious integration into the world of today as part of the common heritage of mankind.

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# THE MYTH OF PROGRESS

by Henrik Skolimowski



The more perspective we gain in judging our intellectual heritage, and particularly the role of science in this heritage, the more bewildered and perplexed we seem to become. The old certainties that science is the beacon of light and the torch of truth are now fading away. Instead, we cherish profound doubts about the value of science, and the value of the entire intellectual enterprise. How did it happen that the enterprise which seemed to be thriving and prospering in the early phases of its development appears ambiguous and tottering in its mature and developed stages?

One of the most important among the causes that prompted us to develop science and technology, as we see them today, was the ideal of the earthly paradise, of the fulfilment of man here on earth, instead of therein some transcendental heaven. The idea of the fulfilment on earth has in time become institutionalised and known as the pursuit of Progress, which in its turn has become the driving force of the whole civilisation and a justification of a great variety of pursuits and aspirations of man; indeed it has become an overriding principle with the force of a moral imperative expressed in one commandment: one must not be against Progress.

Although elements of other concepts of progress, of a metaphysical and religious variety, linger in the background and sometimes inspire us to think of progress in more embracing philosophical terms, we should be perfectly aware that what is known as the typically western concept of progress can be characterised as: pragmatic, empiricist, scientistic, exploitive, elitist; pragmatic because this progress is mainly preoccupied with material gains and practical improvements for the immediate future; empiricist because the world is viewed through the empiricist spectacles, as basically made of physical parts interacting in a mechanical fashion; scientistic because the laws of (physical) science are thought to be of supreme importance -they are the tools by means of which we manipulate the physical universe to our advantage; exploitive because the natural resources and subtle balances of the eco-system have been taken for granted and indeed treated in a nonchalant, ruthless and upperhanded manner characteristic of conquistadores; elitist because this

progress has actually benefited a very few at the expense of very many, and at the expense of natural resources belonging to all.

### The Interdependence of Science and Progress

There is no doubt that one of the chief architects of this kind of progress was Francis Bacon. He is particularly important as he linked together general progress with the progress of scientific knowledge. In the Western civilisation we are in the habit of linking the two sciences. The announcement "Knowledge is Power" heralded the fundamental shift from the Greek conception of knowledge conceived as enlightenment, to the instrumental conception of knowledge, conceived as power. In this shift from the Platonic conception, in which knowledge is a vehicle of self-enlightenment and spiritual fulfilment, to the present conception, in

which knowledge may result in the mushroom over Hiroshima, there is clearly expressed the difference between the Greek conception of rationality and the modern conception of rationality. Francis Bacon should not be blamed for atomic horrors and electric toothbrushes. Yet, his ideology governing the use of science, the ideology which insists that knowledge must be fruitful of works, not of words, and that with this knowledge we must control and use nature to our advantage, is at the core of our pursuit of Progress.

The 17th century is by no means a homogenous era (as some would like to portray it) in which science, liberated from the tethers of medieval theology, was unequivocally marching towards truth and factual knowledge. Newton himself was as much a theologian as a physicist. Indeed, his physics, by unifying terrestrial and celestial phenomena under one set of laws, was meant to be a tribute to the glory of God, a restoration of the harmony of the universe undermined by previous erratic accumulation of knowledge. In his desire to show the greatness of God through the harmony of His universe, Newton was much closer to Copernicus (who was inspired by similar motivations in composing his De revolutionibus) than to his empiricist-minded followers. Yet, let us pause for a second and ask ourselves what have we made of Newton? A quantifier of nature, a mere executioner of the design laid by Galileo, who maintained that the book of nature is written in the language of mathematics. Out of Newton's very rich opus we have selected as his contribution to our intellectual heritage those parts and elements which square with the empiricist-scientific tradition, which was to dominate the Western world during the last two centuries.

The articulation of the 17th century science in the direction of all pervading mechanism and determinism occurred in the 18th century, mainly in France. The French Encyclopedists of the second half of the 18th century were unmatched in their influence in spreading the scientific world view, as based on the enlarged model of Newtonian mechanics. Voltaire, Diderot, D'Alembert were not so much original philosophers as great popularisers of (what we accepted later as) the scientific Weltanschauung. They were par excellence Baconian ideologists of science, with this difference, however, that they lived in the era in which the universe was viewed as a clock-like mechanism. The Encyclopedists thus combined the Baconian ideology of science (with the concept of Progress latent in it) with the principles of the post-Newtonian mechanistic science. There should be no doubt whatsoever that the Encyclopedists were faithful followers of Bacon and especially of his ideals of useful knowledge.

In Western civilisation we are in the habit of linking two sciences. The announcement "Knowledge is Power" heralded the fundamental shift from the Greek conception of knowledge conceived as enlightenment, to the instrumental conception of knowledge, conceived as power.

There should also be no doubt about an unparalleled influence of the *Encyclopedia* on the whole development of the Western intellectual tradition. In the second half of the 18th century France was not only the *arbiter elegantiarum* of Europe. She was also the decisive intellectual influence. The French credos of the Enlightenment have become universal credos.

A great many ideals of the Enlightenment called for the liberation from various tyrannies. They were directed against clericalism, feudalism, and the remnants of scholasticism. The positive thrust of these ideals (although not always clearly formulated) unmistakably point out a certain concept of Progress as unifying Reason, Science, and the Amelioration of the Material Condition. It will be no exaggeration to maintain that from the second half of the 18th century on the progress of science is more or less identified with the progress of humanity; both are implicitly or explicity related to the amelioration of the material condition. At this point we encounter a circular process in which general progress and the progress of science co-define each other, or at least reinforce each other.

Science and technology have provided the instrumentation of and for our ideal of Progress: they have filled the median sphere between our conception of the world (that which is

given to us a priori) and our conception of the ends of our life (that which we construe ourselves and then relentlessly pursue). But the process has not stopped at this level, for the instrumentation (methodology) has in time become ontology (the outside world has become constructed according to the limits and requirements of scientific methodology), and, ultimately, eschatology (the unique and qualitative ends of our lives have become increasingly determined by the quantitative methodologies operating predominantly on physical matter). Thus, the three elements: the world view, science and technology, and progress merge into each other and become indistinguishable.

Expressed in a different manner we can see a hidden circularity that unifies Progress, science, technology and lifestyles: ideals of material progress prompt science to explore the physical aspects of the universe in a predominantly quantitative manner: and prompt technology to produce goods and gadgets that contribute to our material standard of living; the presence of this science and this technology (which form the backbone of our world view) in turn justifies our materialistic and quantitative lifestyles.

Needless to say, it would be silly to maintain that there was one concept of Progress which like a Demiurge was overlooking the development of science and was forcing it into a predetermined cast. The concept of progress has changed historically. And so has the concept of science. What concerns us here, however, is not the minutiae of subtle differences, but the resultant effect, the common denominator, the most powerful line of convergence, the overriding influence which has affected not only the development of science, but of society and civilisation. Viewed in this perspective Progress can be pereceived as bending the general course of science into its direction.

Let us notice, in this respect, that there was quite a number of philosophical interpretations of science in the 17th century among which Leibnitz's, Pascal's and Descartes' deserve special notice. In the long run, however, none of them prevailed and established itself as *the* scientific world view, but rather that which is a concoction of Bacon and the Encyclopedists with its pragmatic, empiricist,



positivist, scientistic orientation, which was decisive for the making of modern technology and of technological society. This orientation is built into our notion of common sense; at least it is omnipresent in what we call the commonsense of science.

How strange and powerful is the bending influence of a civilisation set on a certain track of progress can be perhaps illustrated by the plight of two geniuses: Immanuel Kant and Albert Einstein. Kant belonged to the period of the Enlightenment and was perhaps its crowning glory. He created a system of ideas which fully accepted science and resolved many paradoxes which were unresolved in empiricist epistemologies. Kant's system was certainly superior in its novelty, originality and its breathtaking scope over previous systems of empiricists. But how large was Kant's influence on our culture and civilisation? Small indeed. We are not overlooking Kant's considerable influence on the 19th century European intellectuals, but nevertheless insisting that Kant's influence on the overall course of our civilisation was negligible. (Marx, though much less original, was much more influential.) Was it because Kant did not cherish the ideal of Progress and proclaimed instead "The starry heavens above me and the moral law within me"? Even stranger is the case of Einstein. He is said to be the greatest scientific genius since Newton, and perhaps of old certainties and produced a great deal of uncertainty and confusion, particularly about the universe of science. Did Einstein's concept of all times. Yet what did the Einsteinian Revolution amount to? It undermined science exert a profound influence on our culture? Not so far. (Freud, though much less of a genius, has had much more profound an influence). Did Einstein have a decisive influence in changing our notion of common sense and in reconceptualising the physical universe that science explores? We are told that in this respect the lesson of Einstein has not yet been fully digested.

#### The Vicissitudes of Scientific Progress

One of the vital characteristics of post-Galilean science has been its inherent ambiguity regarding its fundamental role in human society. This ambiguity lies in the fact that science has constantly oscillated or vacillated between the two poles, the purely cognitive and the purely pragmatic.

Galileo Galilei, this arch-apostle of the pythagorean quest for the mathematisation of the cosmos, was himself full of praise of science as a useful knowledge helping us to overcome our natural handicaps. And so was the Royal Society which on the one hand sheltered and nurtured Newton, and on the other, constantly emphasised the virtue of useful knowledge. The split or the dichotomy between the cognitive and the pragmatic aspects of

Aerodynamics in the biosphere

science was kept continually alive throughout the 18th, 19th and 20th centuries.

While the justification of scientific progress in the circumstances when science drapes itself in the entirely cognitive mantle is one thing, it is altogether another when it assumes upon itself a pragmatic mantle. The declining confidence in science has been brought about exactly by a conjunction of two separate crises of science: as a cognitive enterprise and a pragmatic enterprise. The first has occurred mostly as the consequence of the internal developments in science. The second has occurred as the consequence of developments external to science. The first has resulted in a gradual undermining and ultimately in rendering useless the criteria of scientific progress as based on the alleged search for truth. The second undermining the criteria of scientific progress based on the alleged as amelioration of the human condition.

Now, science, dressed in the cognitive mantle insists that its task is the discovery of truth, and ultimately, the formulation of permanent, inexorable laws. The progress of science is the pursuit of these laws. In the conception of immutable, inexorable laws, cognitive ideal of science the the Platonic coincides with conception of ultimate knowledge. It must be made absolutely clear that the meaning and justification of the progress of science here depend on the acceptance of eternal truths and of

immutable laws. In the Newtonian era of science we believed, and indeed were convinced, that the attainment of absolute laws was possible. In the second half of the 19th century, and particularly as the result of the emergence of non-Euclidean geometries and anomalies in the corpus of classical physics which led to the Einsteinian physics, we ceased to believe that science, especially physics, provides immutable laws. The consequence of this should be clear: if science cannot be defined as the enterprise which seeks and establishes ultimate laws, then progress in science cannot be defined as the process by means of which these laws are attained. Yet this conclusion was not clearly drawn in the 19th century. The spirit of Newton was still too strong and the longing for absolute knowledge still paramount.

Only in the 20th century after the import of Einstein was absorbed, did we begin to acknowledge, though with great reluctance, that no knowledge is absolute, that all laws are temporary and revocable, transient and tentative. The philosopher who drew the epistemological consequences from Einstein's physics—boldly and unequivocably, and made them the basis of his epistemology and his philosophy of science, was Karl Popper.

Perfectly aware of the indefensibility of scientific progress as the attainment of ultimate truths, Karl Popper advanced the idea (*The Logic of Scientific Discovery, Conjectures and Refutations*) that science does not seek ultimate truths but is satisfied with approximating truth. Progress of science consists in closer and closer approximation of truth, or in refutation of less penetrating theories in favour of more penetrating ones. The difficulties here with the idea of "the approximation to truth", "more penetrating versus less penetrating theories", "empirical testing of theories"—as a vehicle of refutation and ultimately as the vehicle leading to closer approximation to truth are quite considerable.

One of the vital characteristics of post-Galilean science has been its inherent ambiguity regarding its fundamental role in human society.

Thomas Kuhn, though acknowledging his indebtedness to Popper, ruthlessly exhibited these difficulties (The Structure of Scientific Revolutions) and opened a Pandora's box of problems. Kuhn's book has become a cause celebre because of the powerful idea of the paradigm there outlined; the paradigm being a conceptual super-structure that governs the development of science at a given time. It has been curiously overlooked that the Structure of Scientific Revolutions, (and the controversy concerning this book during the last ten years), signify the last stages of the disintegration of the cognitive justification of scientific progress.

The progress of science within Kuhn's model can be construed as the transition from one paradigm to

another; alternatively as the articulation of the particular paradigm. The former has no other justification except that the more recent paradigm has replaced the older one and that it solves new problems (which it was meant to solve for it was expressly designed to solve them!); the latter kind of progress is tautological: if one accepts the paradigm of a given time, one of necessity accepts its concept of progress. None of these concepts of scientific progress has a justification outside itself: the paradigm is a selfjustification of its ideal of progress. Thus, if we accept Kuhn's model, we are deprived of any non-tautological, historically relevant justification of scientific progress. To make matters worse, Kuhn's critics have made strenuous efforts to effectively undermine all basic tenets of Kuhn's model. (See: Criticism and Growth of Knowledge, Lakatos and Musgrave, eds.) Some have denied the existence of normal science (Watkins) thereby implicitly denying the idea of progress as based on the mapping operations of normal science. Some have denied the existence of scientific revolutions (Toulmin), thereby implicitly denying the idea of progress as based on switches from one paradigm to another. Some have denied Kuhn's explicit contentions concerning scientific progress (Lakatos), Lakatos, incidentally has turned out to be a most vigorous critic of Kuhn. But what he (Lakatos) proposes as the criterion of scientific progress is either tautological (progress equals progressive problem shifts are new problems which the



scientific community embarks on either as the result of the paradigm shift or in articulating a given paradigm).

All in all, the present philosophy of science is in a sorry state because the traditional cognitive frameworks for justifying the validity of the scientific enterprise (and its progress) are in serious trouble. Consequently, all these criticisms, encounters and counter-encounters spinning around the Kuhnian model are epicycles built over epicycles. The conceptual anarchy in our perspective on science is now complete.

Let me return to Kuhn and his notion of scientific paradigms. Though far-reaching and revolutionary in many ways Kuhn's notion of science is too narrowly conceived. For this reason Kuhn's model of science, as well as the variety of models of his critics, who basically accept Kuhn and only seek small adjustments here and there, are rapidly becoming *irrelevant*.

In Kuhn's considerations an overwhelming weight is attached to the notion of scientific problems. The pursuit of certain kinds of problems results in paradigm shifts. Articulating problems of a given kind signifies progress (within a given paradigm). The structure of problems is for Kuhn the ultimate datum, indeed a fetish. Problems are, so to speak, Kantian things-in-themselves. There are actually two kinds of absolute givens: scientific problems and scientific communities. The history of science and indeed our entire intellectual history is for Kuhn, the interplay of these two ultimate givens. This surely cannot be right.

Problems are neither hermetic entities nor things-in-themselves. Problems emerge as man interacts with the world at large. Problems man investigates are a part of his life, a part of his world view, an activity he considers humanly important. In order to understand man's problems we must understand man's view of the world and his conception of himself in this world. We must understand his overall cosmology and his overall eschatology (be it transcendental or secular).

Problems that ancient Greeks were fascinated by, and attached a particular importance to, were without any question linked to their world view and to their overall concern about what man ought to do and ought to be. The same is true of problems of



Pyramid at Gizeh

Arabic science and the respective view of the Arabic people at the time; and the same is true of medieval Europe. We cannot understand their problems without understanding their world views and their conception of man. This is no less true of science and its problems. The key lies not, as Kuhn contends, in examining the internal structure of problems without paradigms but in understanding the general view of modern man. Kuhn would say, and does actually say that if problems do not have certain characteristics, they are not scientific problems; and if transitions from one thought formation to another do not comply with his notion of the paradigm they are not scientific revolutions. This is certainly a question-begging strategy, for science in the future may come to signify quite a different set of procedures and problems from those of the present science. In insisting on the tautological definition of sciencescience is what science has done in the past-Kuhn deserts his own evolutionary position according to which science is an evolving entity. If it is evolving, then we must not put it in the straight jacket of the existing, or of

Barnaby's Picture Library

the past norms. Furthermore if it is evolving, then it may evolve in radically new directions.

Let us observe in this respect how confining is Kuhn's conception of nature. Science is, according to Kuhn a specific investigation of nature. But how is nature conceived? It is a Newtonian concept of nature. Although Kuhn does not say this explicitly, he implicitly accepts the Baconian-Newtonian conception of nature. If we change the paradigm of nature, then we may have to change quite substantially our notion of scientific problems.

Einsteinian science taken in its unlimited consequences seems to lead to an alternative conception of nature. From the start, already as a student of the Zurich Polytechnic, Einstein seems to have been inspired by a unitary vision of nature-in contrast to the scientific conception accepted of nature as made of atomistic bits. This unitary vision led Einstein to devote many a year to the search for a unified physical theory, on which he is said to have worked to his last days. Many, including Kuhn, have accepted Einstein without drawing



Pyramid Hotel at Les Grandes Mottes

from Einstein's conception of nature any consequence as regards the characteristics of scientific problems. Nature can be reconceived in still more radical ways. Should we listen to Kuhn when he protests that the term paradigm is to be applied to science only, and not to any larger construct such as society, civilisation or nature? This surely is a spurious argument. Kuhn's conception of the paradigm hinges on a certain conception of nature. Given a radically different conception of nature (for example not as objectified sphere of exploration "out there" but as a part of a larger envelope which is "us"), Kuhn's conception of the scientific paradigms (as concerned with a specific kind of nature) simply collapses.

All in all, Kuhn is becoming increasingly irrelevant because in one of our most recent discussions of the nature of science vis-a-vis society and civilisation we are questioning and examining some of the fundamental assumptions on which science operates and which Kuhn, alas, uncritically accepts. Thus in spite of his revolutionary tenor Kuhn's model is traditionalist and conservative. Kuhn has little to offer in present discussions about science as an intellectual ladder on which we climbed towards the earthly paradise and found ourselves in the miserable pit. Perhaps I am mistaken. Perhaps Kuhn will speak out to correct me.

One final word about scientific revolutions. If we accept that science is not the thing-in-itself, which investigates "scientific problems" as if they were hermetic entities, but on the contrary that scientific revolutions are not to be defined as those relatively isolated intellectual episodes. but rather as those transformations which have significantly influenced the lifestyles and the vicissitudes of the whole civilisation. In this concept, Copernicus's and Darwin's were genuine revolutions; Newton's and Einstein's much less so. Does this view depart from the accepted orthodoxies? Perhaps. But perhaps we need to reflect critically on the accepted orthodoxies and start asking ourselves altogether new questions about the nature of science and its role in the making and the breaking of our civilisation.

I argued on the preceding pages that in its development science has undermined not only its well-established theories, but also its *modus* 

operandi as the discoverer of the ultimate truth. With the disappearance of its Platonic ethos, science began to exhibit increasing difficulties in justifying its progress in cognitive terms. The 20th century models of science, particularly those of Popper and Kuhn, while emphasising the evolutionary character of science, and the tentative nature of scientific truths, weakened further the foundations for solely cognitive justifications of scientific progress. Most recent discussions of Kuhn's model have led to a state of cognitive anarchy, in which all traditional cognitive criteria seem to have been undermined. Thus any coherent cognitive justification of scientific progress seems to be precluded. Quite independently, science has come under criticism from a social point of view. This has led to the broadening of the scope of our investigations of science far beyond predominantly cognitive frames of reference such as Kuhn's. As the result we have further shifted the emphasis from cognitive to pragmatic justifications of scientific progress: (in the broad sense of the term "pragmatic").

### The Mechanisation of the Cosmos

It can be easily agreed that the function of inventions is to enhance, broaden, enrich and ameliorate human life. Let us observe as a preliminary point that the amelioration of human life in economic terms alone is not the same as the enhancement, broadening and enrichment of human life in general. Here we touch upon a crucial dilemma. For in Western civilisation the amelioration of human life came to be viewed as amelioration in material terms, in economic terms especially. In reducing the larger ideals to narrow economic schemata, we have subverted the goals of our civilisation and the goals of our lives. In the process we have distorted the history of technology, in particular we have falsified the notion of inventions. The act of invention may resolve itself: 1. In the realm of Art as a new art form, for example, the sonnet, or an impressionist style of painting, which brings enjoyment to the senses and fulfilment to the soul.

2. In the realm of *philosophy* (broadly conceived) as a new schema for the explanation of the world which brings us psychological security, or satisfies

our curiosity, or evokes in us a sense of wonder, each of which are satisfying some human needs.

3. In the realm of *Technology* as a means for ameliorating the material conditions of human life.

The plethora of inventions in Western civilisation is impressive. But these inventions tend to be predominantly of one kind: mechanical inventions directed to the increase of efficiency of performance.

Now, let us reflect on the meaning of the phrase: "need of invention". This notion is usually innocently introduced as something obvious. The time for an invention is ripe when there is need for this invention. This last element means that society wants to improve the efficiency of such and such processes, or in order to produce more objects of this or that kind. We are so used to our concept of the "need" for invention that we assume that whenever "need" is in question, it signifies the Western sense of the term, namely a further drive towards efficiency or a further perpetuation of material progress. But, to take, one example, the need to beautify Gothic cathedrals with stained glass was an altogether different kind of need.

Thus, the Western notion of the need for invention is a particular one, not universal, and it is a gross mistake to think of it as universal. On a closer analysis we find that our entire Western ideology, or at least a good part of it, is built into the notion of the "need" for invention. In this notion we find concealed the defining components of our civilisation: its acquisitiveness and its idea of conquering nature, its drive towards material progress, its drive towards amelioration via the technological efficiency of material gadgets. In brief, the act of invention becomes the act of technological invention, in our sense of the term, if and only if, the secular ideology of Western civilisation is built into the notion of "need for inventions". Then, but only then, invention becomes an innovation: an induced and partially controlled process to further the increase of efficiency. And then invention often serves the cause of the death industry, and not the cause of the amelioration of the human condition. And then, curiously enough, the drive towards genuine invention towards novelty and originality is often suppressed because genuine invention and



originality disturb the smooth functioning of the technological machinery whose chief motive is to make profit through the incremental increase of efficiency. The plight of institutionalised and corporate invention-making is not only natural but also inevitable. Corporate inventions aim at small novelties which will not disturb the equilibrium of the system which is set for making a profit.

#### In Western civilisation the amelioration of human life came to be viewed as amelioration in material terms, in economic terms especially.

To attribute the secular ideology of modern Western societies to past civilisations is unjustified, if not downright nonsense. It is equally unjustified to analyse the act of invention in pre-Renaissance societies and civilisation in 'terms of the "need for invention" when the notion is understood as containing in itself our secular ideology. This kind of analysis of the act of invention, however, is quite common. We should therefore not treat the idea of "need" as a descriptive, but rather as a normative or ideological component of the act of invention. Different ideologies define the need for invention in different ways. This is at least a partial reason why the "seeds" or the nucleus of some inventions remained in an embryonic form for a long time and came to fruition only much later. There was no "need" for a given invention which remained in an embryonic form, because the set values

ILYEU witch doctor healing his patient

of a society, which we may call ideology or an underlying mythology, did not favour this particular kind of invention. This set of values is an historical category, and is determined by the ruling ideology. There are many victims who are misled by the apparent innocence of the notion "the need for invention". Rupert Hall is one. When he analyses pre-Renaissance inventions in The Technological Order. Stover, ed.) he constantly trips over the notion of the "need for invention", which he assumes to be the need for increased efficiency whereas none had existed. Hall and a host of other scholars systematically misread the nature of pre-Renaissance technology, for they try to force these technologies or modes of production based on them into conceptual boxes justified by our notions of technology. The distortion of the nature of the act of invention in pre-Renaissance technology is inevitable if one interprets it through our concept of material progress as the condition sine qua non for making inventions. We have been so brainwashed by the ideology of modern science and modern technology that we constantly compare other epochs with ours and point out how dismally they failed by not meeting our standards. Our ideals were not their ideals.

It is interesting to observe that in the past relatively simple technologies led to splendid and lasting results whereas in the present complex and intricate technologies lead to shoddy results. The stained glass of the Cathedral at Chartres, (and the Cathedral itself!) the mosaics of the Mosque



Radiographer applying radiation to patient

of Omar (The Dome of the Rock) in Jerusalem were produced by primitive technologies and yet the results are splendid and lasting. Our splendid technologies produced the Empire State Building, the jumbo jet, the electric toothbrush. We should not frown in protest for the electric toothbrush is a highly sophisticated product of highly sophisticated technologies in which many inventions are incorporated. There are other examples which point out less trivial aspects of modern technology. No doubt. But the overall balance increasingly shows the progressive trivialisation of our lives through increasingly sophisticated technologies.

#### The battle against entropy

The primary function of the tool is to enhance life or to counteract entropy. Tools are the means with which we create anti-entropy, or reduce the effects of entropy. The biological organism can be considered a natural organon for combating entropy. The man-made tool can be considered an artificial organon for combating entropy.

Since man is not only a physical being we can and perhaps should enlarge the concept of entropy to include other aspects of man: cultural, social, psychological. Tools are important in counteracting physical entropy. But they are equally important in counter-acting cultural entropy, social entropy and psychological entropy. To be alive as a human being is not to be dead: as an energy system, as a distinctive individual. In order to enhance human existence tools have Barnaby's

always acted as anti-entropic instruments, not only in the realm of physical energy, but in the realm of cultural and social interaction of men.

This is admittedly rather a broad concept of the tool. But anything less embracing does not do justice to the role of the tool in man's ascent to the human level. Tools are neither true nor false. The validity of the tool must be assessed by the role it plays in our fight against physical, cultural, social and psychological entropy.

Any coherent and comprehensive notion of the tool must include language among the tools man uses. The importance of language as an instrument for the perpetuation and enhancement of man's life is inestimable. In the 19th century man was defined as the tool-making animal. In the 20th century man has been defined as the language animal. Language is one of the fundamental divides that distinguishes and separates us from other animals. The more we learn about language the more impressed we are with its enormous complexity and depth, and the more persuaded we are about its paramount function in the process of socialising and humanising the naked ape. Language has been the unique tool and perhaps more important than any combating cultural and social forms of entropy.

But language also plays a vital part in the production of physical tools. Concepts are tools that make other tools possible. In the more civilised stages of man's existence tool making has been a social process. In this process we are extremely dependent on the use of language. Most of the instructions in the process of tool making are carried on by means of language. Thus language and its concepts are an intrinsic part of *all* tool making.

Language is not the only important tool which makes human life *human*. Equally important is art. For art is a tool for the survival and the enhancement of the spiritual aspects of man. Art is thus a collection of tools for refining and perfecting man's sensibilities so that he can interact with nature and with other men in an ever more articulate versatile and fulfilling way.

Between man and the world there is language. Between man and the world there is art. Between man and the world there is technology. We never interact with the world directly but always through the median of language, of art, of physical tools. Even when our reaction is most spontaneous, it is the human spontaneity that erupts, the spontaneity that is conditioned by our knowledge of the world (knowledge as embedded in language which we use and which uses us), conditioned by the experience of art, conditioned by the whole sphere that lies between man and the world. This sphere is as it were, an envelope within which man lives and experiences. Man is never naked. It is this median sphere which is made of art, language, myth and technology-all woven togetherwhich has enabled man to ascend to the level of humanity he has so far achieved. The whole median sphere or the homosphere is composed of manmade tools. They are all instruments to extend man, to augment his physical and non-physical faculties, to enrich his physical and spiritual life. Thus we arrive at the concept of the tool, as a median between man and the external world. Everything that is in this sphere may be equally regarded as a tool. Hence language is a tool. And so is art. And so are mechanical devices. The totality of man-made inventions and tools: technological, scientific, conceptual, artistic and otherwise compose the universal median in which man lives. No part of this homosphere is more justified to be called a tool than the other. The entire culture belongs to the homosphere for it is but a subtle wrapping, a buffer zone which absorbs various shocks and which provides a modicum of civilised existence.

Different civilisations mark different stages of the development of the universal homosphere to which all tools belong. Different civilisations often emphasise and develop different aspects of this homosphere. Different civilisations we might say, instrumentalise the world differently. Consequently they interact with the external world in a variety of different ways. There is no ultimate criteria that would enable us to decide which instrumentalisation of the world is superior to others. In the last analysis, the validity of a particular tool and the validity of all tools, of the whole homosphere, is to be judged in terms of its overall capacity to counteract all the varieties of entropy which man is subject to.

We can now approach the problem of tools in the Western post-Renaissance civilisation. It becomes obvious at a glance that we have been pursuing a path that led us astray. For we have excessively developed one kind of instrumentalisation as represented by mechanical and physical tools. As the result, the whole homosphere has become saturated with tools for saving physical energy at the expense of other tools. The envelope in which we live, that is to say as a civilisation, has become coarse and rigid. Our failure to interact adequately with nature, our failure to develop adequate social structures is at least partly the result of this onesided instrumentalisation, of the excessive pre-occupation with tools of a special kind: mechanical, physical, deterministic. For, to reiterate, man is never naked. He always interacts with the universe through a median, through an envelope which is given to him or rather thrust upon him at birth by the civilisation in which he is born. Our civilisation through an excessive development and adulation of mechanical tools made this envelope coarse and thus has coarsened our responses to and our interactions with the rest of creation.

This one-sided instrumentalisation of our culture started in a pronounced way as might be expected with Francis Bacon. Being a supreme ideologist of modern civilisation, he called for a progressive instrumentalisation of the world in order to extend man's powers as he conceived of them. "Neither the naked hand nor the understanding left to itself can effect much. It is by instruments and helps that the work is done, which are as much wanted for the understanding as for the hand. And as the instruments of the hand either give motion or guide it, so the instruments of the mind supply either suggestions for the understanding or cautions". (Novum Organum, Book 1, 2).

The progress of useful knowledge through the 17th and 18th centuries meant an increasing importance of physical and mechanical tools. Ernst Kapp, for instance, contends that the history of humanity can ultimately be rendered as the history of ever more perfect tools. Tools for Kapp are physical artifacts. Kapp claims that the perfection of physical tools is a pre-condition of the development of man's self-consciousness. This thesis was widely held in the 19th century. It

Everything that is in this sphere may be equally regarded as a tool. Hence language is a tool. And so is art. And so are mechanical devices.

is still cherished by many. But it does not have much support in facts, as Lewis Mumford and others have shown.

The homosphere, the man-made realm between man and the outside world, is composed of many diverse elements, and it cannot be reduced to one element, to physical tools. Moreover, the physical tool itself is not entirely physical. Other kinds of tools which are present during the process of its production and during the process of its use should make us aware that man's ascent is not just a simple process of perfecting physical tools. It is surprising that even Carlyle was so intoxicated with the idea of technical progress that he defined man as a toolusing animal.

#### Life Versus Progress

We shall now turn to the pragmatic justification of scientific progress. This justification can be quite crass, as it is in some forms of pragmatism when truth is equated with utility, or quite subtle, when knowledge is considered as an abstract tool aiding human survival.

Let us first of all notice that the justification of knowledge for the human species is not the same as the justification of the value of science. From the fact that we agree about the value of the *whole* knowledge for the *whole* development of the species does not follow that we agree about the value of a *particular* sort of knowledge (science), at a *particular* historical period. Arguments pointing out that knowledge is an abstract tool effectively aiding human survival establish the former, not the latter.

When we talk about the value of science and ultimately of progress in science in broad pragmatic terms, we presumably mean the total effect of science on the welfare of man. Progress then signifies succeeding stages in the amelioration of the human condition. What does this story of the amelioration of the human condition look like?

Let us not delude ourselves that the consequences of Progress have been beneficial to all. The pursuit of Progress has been an *elitist* enterprise *par excellence*. Not only did we exploit the people and parts of the world that are outside the magic ring of Progress, but within the ring itself we have been admirably efficient, which is another way of saying: admirably ruthless.



Amerindians building a "bohio"

For how can we justify the terrible human misery that followed the Industrial Revolution in Britain, when people were chased off the land and flocked into the dungeons of the 19th century factories? All of this was done in the name of Progress. How can we justify the perpetuation of slavery in the United States, so that the cotton industry could "progress"?

The metaphysics of progress is based on a exploitive and parasitic, form of philosophy. Progress has been a cover-up for Western man's follies in manipulating the external world. If these words sound harsh, let us look at what *actually* has been accomplished under the auspices of Progress, and at what *price*. The fact that we have wholeheartedly believed in Progress as good and beneficial does not make it so in virtue of our beliefs. The Holy Inquisition believed itself to be an embodiment of goodness and virtue.

Modern medicine is a wonderful thing, but it has lost sight of the whole man. We educate exceedingly well-qualified specialists who are however only concerned with this or that aspect of the human body. At the same time we have created a vacuum -there is nobody to look after the whole man. In 1931 there were (in the US) six general practitioners to every single specialist, while in 1967 there were three specialists to every single general practitioner. ("The Task of Medicine", Scientific American, April 1973). Moreover: overspecialised. scientifically-based, technology saturated medicine is becoming prohibitively expensive, so that only the rich can afford it even in affluent countries.

We live longer, but often the life of cabbages. The prolongation of a man's life is not equivalent to the increase of man's well-being, let alone to the increase of man's happiness. We live more comfortably but often at the expense of great anxieties about how to maintain this comfort. In short, living more comfortably, eating better and dressing better does not by itself add up to a happier life.

Doxiadis has shown that when we travelled with the speed of about 8 miles per hour it took us an average of about 5-10 minutes to get to work. When we travelled with the speed of about 25 miles per hour, it took us about 20 minutes and when we travel nowadays with the speed of about 55 miles per hour, it takes an average of about 45 minutes to reach work.

We travel faster, but often from one artificial environment to another artificial environment. So there is travel, but no new experience. Moreover, we travel faster, and yet it takes us longer to get to work. Doxiadis has shown that when we travelled with the speed of about 8 miles per hour it took us an average of about 5-10 minutes to get to work. When we travelled with the speed of about 25 miles per hour, it took us about 20 minutes and when we travel nowadays with the speed of about 55 miles per hour, it takes an average of about 45 minutes to reach work.

Is this progress or an illusion of progress? But this problem of using



Modern Peruvians building a tower block Ecologist, Vol. 4, No. 7

the car for the sake of transportation has another, more profound dimension. It has been estimated that about 24 per cent of the converted energy (in the US) is used by motor vehicles and another 10 per cent goes to the maintenance of roads for these vehicles. It thus appears that more time and energy is wasted while maintaining traffic than is actually saved through traffic. Is this progress or an illusion of progress? Concerning the new accessibility of things: no doubt we buy and "consume" more books, records, reproductions, but most of them have become mere commodities. We are bombarded with new information but we acquire no new knowledge, let alone new experience. Is this progress, or an illusion of progress?

Let us consider another point. The population of the US consists of 6 per cent of the world population. And yet we consume about 33 per cent of world resources. The population of the affluent hemisphere (US, USSR, and Europe) consists of about 20 per cent of the world population. And yet they consume about 60 per cent of the world resources. No wonder therefore that as a result 67 per cent of the world's population suffers from protein deficiency, (according to the World Health Institute), which translated into simple language means that 67 per cent of the world's population is undernourished. Is this progress, or an illusion of progress?

Progress has at once enriched our life and impoverished it. Progress has opened for us many new options, and at the same time, closed many old options. But let us not be impressed by mere numbers of options, and let us see what kind of options were given to us, and what kind of options were taken away from us. We have more choices of automobiles, detergents, clothes, insurance policies, in short a great variety of man-made objects. But at the same time we have fewer chances to commune with natural habitats, with different cultures, with different people. Thus our fundamental choices have diminished, whereas the choices of artificial objects have increased. Material progress has homogenised the world for us. And here lies the crux of the matter.

The evolution of life has been a process of ever increasing diversity. We can even say without much exaggeration that the essence of life, particularly in complex organisms, is diversity. The ascent and the evolution of man has been a process of increasing diversity *par excellence*. Thus progress judged on the evolutionary scale, is a process of ever increasing versatility and diversity of organs, functions, modes of behaviour, responses.

Material progress on the other hand, particularly in the advanced stages, in which it works towards the technological society and toward one homogenised world, tends in the opposite direction—towards arresting and diminishing versatility and diversity. As such it is becoming an anti-life proposition in the evolutionary sense: it diminishes the diversity and versatility of life for the sake of the diversity of artificial objects and artificial environments.

Material progress which was meant to be a vehicle for the amelioration and enhancement of life is turning into its opposite into a force that is arresting and constraining the versatility of life.

We witness a great paradox here: material progress which was meant to be a vehicle for the amelioration and enhancement of life is turning into its opposite-into a force that is arresting and constraining the versatility of life. This dialectics-of thesis becoming an anti-thesis. though startling and difficult for us to accept, is by no means something singularly exceptional. Nearly all human institutions in the course of time begin to malfunction and indeed become counterproduce productive results and opposite to those intended.

#### Forms of obscurantism

Many still defend progress as a part of our rational heritage and cast thunder on those who question any part of this heritage. We must realise that the arguments of protagonists of present technology and of the present idiom of progress who, completely heedless of all the evidence given to them, call the critics of the *status quo* irrationalists and neo-Luddites, are simply gratuitous if not irrational. 258



Progress hits T'Slawatt Indians

There are various forms of obscurantism. The "learned" obscurantism of biased scholastic pedants can be as pernicious as the blind obscurantism of the uninformed ignoramuses. We must take seriously such people as Barry Commoner who shows (*The Closing Circle*) the *irrationality* of certain seemingly 'rational' forms of behaviour in the pursuit of progress. Here we witness another paradox, another dialectical reversal: the rational in the small turns into the *irrational* in the large.

In the light of these remarks it is all too clear that Peter Medawar's sermon that "To deride the hope of progress is the ultimate fatuity, the last word in the poverty and meanness of mind. Completely misses the point. Hope of progress is but a piece of hollow and fatuous rhetoric. For all his enlightenment, his delight in poetry, and the acumen of his mind, Sir Peter is a watchdog of the status quo; and a lamentable victim of the ideas and ideals which have led astray not only people like him-the guardians of Pure Abstract Reason-but the whole civilisation obsessed by the idea of the secular salvation.

But we must not go overboard in the opposite direction. We, in summary, until recently acknowledged only the "luminous victories" of science, losing sight of the fact that the whole civilisation was approaching a *cul de sac*, and forgetting altogether that individual lives and individual aspirations express the ethos, the ambitions and the aspirations of the civilisation in which individuals live. In each civilisation dominant beliefs, basic forms of knowledge, the ideal of progress, and individual life styles are all intertwined. It is a mistake to think that in the long run, we could have used science and technology differently than we did, that, in other words, science and technology are neutral universal, rational and eternally valid forms which can be mixed with different contents. We have made of science and technology the kind of instrument our civilisation required for its pursuit of Progress: as a result we evolved Western (not universal) science and Western technology, both being a part of our acquisitive, conquering, materialistic ideology.

In human affairs nothing is inevitable. Neither the old nor the young have a monopoly on truth or wisdom. For the so-called wisdom of the old sometimes turns out to be a tyrannical folly; and the so-called insight of the voung sometimes turns out to be an unadulterated idiocy. Whether we shall mend the punctures and defects of the existing coach of progress and gallop in it to some Brave New World-and rest in it adjusted to the world by chemistry and other techniques of manipulation; or whether we shall negate a substantial part of our heritage, get out of the present coach of progress, and start another arduous but exciting journey in search of spiritual fulfilment-only history will tell.

SICCO MANSHOLT one time leader of the Dutch Socialist Party and until recently President of the European Common Market — is the first important politician to have adopted what might be called the *ecological position* in regard to world problems. He is the key figure today in the critical task of bringing governments face to face with the realities of the world today.

**The Ecologist:** First of all, would you say that MIT's "Limits to Growth" and The Ecologist's "A Blueprint for Survival" have had an impact on European politicians or businessmen?

Sicco Mansholt: Not very much, though they did have a big impact on the general public. They got a shock. They did make some impact on some business, more than on politicians, certainly. Businessmen directly concerned, like pesticide manufacturers in part agree with "Blueprint" and some research into non-persistent pesticides is underway. They do realise that the time will come when pesticides have to be strictly regulated, though they don't seem to show much interest in biological pest control. Certain industries running into shortages may have been impacted; oil companies certainly were. They pretended that they knew about the limits to growth all along, but they did not.

To my great regret. I must say that politicians in general have not been impressed in any way. Perhaps some of them do grasp the implications, but they show no sign whatever of acting on them. Concorde is one of the politicians' virility symbols, a symbol that they are living in the past, and have not grasped the problem.

**The Ecologist:** Does the description apply to our present Prime Minister?

Sicco Mansholt: Edward Heath is a typical conservative. He is applying the policies of 25 years ago. He hasn't learnt anything, doesn't understand the issues.

The Ecologist: But was there no impact in the EEC Commission? What happened to your letter of February March 1972 to the President of the European Communities? And what about EEC's environment programme adopted in July?

Sicco Mansholt: No. Nothing happened to my letter, except that my ex-colleague Raymond Barre (Commis-



VANYA WALKER-LEIGH interviews DR. SICCO MANS-HOLT in Geneva (This interview took place before the General Election of February 1974).

sioner for Monetary Affairs until January 1973) wrote a letter accusing me of having exaggerated the problem, affirming there would be enough energy in the future for growth ... As for the EEC environment programme, it is obvious that my former colleagues don't understand the real problem either. The measures that have been adopted are just marginal nibblings. No environmental measures taken in Europe so far have had any results ... the waters of the Rhine will be much more polluted in 10 years than they are today. The Rhine is a test case. But take the development plans for power stations, industrial effluents pouring into the river. I am afraid it will be a test case, in a negative sense. No wonder the mass are disgusted with Europe. It's a Europe of Business only.

The Ecologist: What is the "real problem", you refer to?

Sicco Mansholt: Ever since 1968, I have been convinced we have to stop growth not only for ecological reasons but because of the enormous gap between developed and developing countries. The increasing gap is proof of our economic failure. Our politicians say that we must grow in order to help the third world grow: that is a lie, the opposite is true. There are not many resources left for the third world, and they are the biggest losers in our present economic system.

We in the rich countries, with our wealth, can buy at high prices the last scarce metals and oils. There may even be raw material wars soon. Already we should have a world energy board with broad powers, but there is nothing in the making. So the billions of poor in the world today will be faced with disaster. How can you increase their standard of living without cheap power? The Green Revolution has also failed. But people like Kissinger don't care either about the environment or the third world.

The Ecologist: Do you expect the present "energy crisis" to modify attitudes?

Sicco Mansholt: Well, just look at the reactions of our politicians. It is to look for other types of power. No one is saying, couldn't we establish a kind of society that needs less energy? Personally, I welcome the crisis; in fact a year ago, I said I hoped the energy crisis would come soon, since it is one event which makes the mass of people realise the implications of limits to growth. Or should do.

The Ecologist: Do you think the unavoidable energy shortages of the future, will mean putting your "Mansholt Plan" for European agriculture in reverse? Getting more people on to the land?

Sicco Mansholt: Five million people have been leaving the land in Europe every 10 years for the last 25 years. But it was mainly the young people, leaving the old ones on the land. Small farms couldn't give farmers a living. The EEC plan gave young farmers a chance to stay, on bigger farms. It was politically impossible to double prices, the only alternative was to increase production per acre by mechanisation, intensive use of pesticides and fertilisers. But this is anti-ecological. Bigger farms are better since in theory, farmers can undertake recycling of wastes. But there is no research on ecological recycling in agriculture. Now, with the energy crisis, I agree people will have to start returning to the land in Europe. As for the third world, "modern" agriculture is a disaster. Multinational companies operating there should be putting small farmers under contract, instead of having huge monocultures.

The Ecologist: But do you see multinational companies taking the lead towards ecological sanity?

Sicco Mansholt: Hardlly, they are

only interested in environmental problems, insofar as they can make a profit out of the whole mess. I have not much hope in business. Royal Dutch Shell, talking about economising on energy, other oil and chemical companies advertising what they are doing about the environment-its demagogic eyewash.

The Ecologist: So it's up to governments to take the lead?

Sicco Mansholt: Definitely. Europe, US and Japan should undertake a billion dollar annual research programme as a minimum-a tiny fraction of research funds at present geared to economic growth and expansion. This world research should first develop non-pollutant and recycling processes. biological pest controls, "ecological" agricultural systems, energy-saving and conservation measures, while at the same time preparing the developed world for a no-growth economy. But look at the outcome of the Stockholm conference-\$100 million for five years. What can you do with that?

The Ecologist: That brings us back to the politicians ....

Sicco Mansholt: Exactly, that is why the ecological movements have to. get into politics. The survival of man-

get into politics. The survival of man- **THE NEXT STEP** Richard Acland In today's situation, most of us think someone ought to make our prob-lems go away—or at least make them smaller than they really are. In this way we get hit on the same place over and over again. Personal creativity and effective involvement come from knowing that headlines and TV news are mere symptoms of something far bigger that em-braces everyone who has lived, is living or will live anywhere on Earth between the birth of our great grandparents and the death of our great grandchildren. This book displays the situation in this way, and suggests what ordinary people can say and do if they would move things—microscopically, no doubt, but definitely—in the way they need to go. Price 95p. Obtainable from The Ecologist, 73 Molesworth St., Wadebridge, Cornwall, PL27 7DS.

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kind is not a political issue. It should be.

The Ecologist: Do you see any signs of a popular ecological movement in Europe?

Sicco Mansholt: Not yet. Only a tiny fraction of the population are really "Ecologically aware" at the moment. The problem is that most measures that have to be taken are unpopular. In Holland, we have a little group of six people, studying the political consequences of ecological difficulties. We spent eight week-ends, brainstorming. Time and again, we saw that our conclusions meant "political suicide" on the present political scene. However, we have not given up. I am convinced that there are ways to unite socialists in Europe, around a modern radical European programme, a programme which doesn't just tinker with the symptoms.

We have to get to no-growth, dematerialise our society, have greater equality, abolish private cars. I will have to take a cut in my living standard myself. We must teach our children quite differently: at present, as I see with my five-year-old grandson, they are being programmed at school to take part in the economic rat race.

People are defined by their occupation, not their talents or inclinations. We must have a society in which people say, when you ask them what they do, "I go fishing", "I play the piano" instead of "I am a banker" or "I am an unskilled worker".

But it is difficult, I realise. Young people feel things are wrong, they are willing to fight. Workers are another problem. At present they are as committed to growth as their bosses. As for the bourgeois, don't bother to convert them. They will have to be starved out, when the time comes.

The Ecologist: But can you foresee people supporting such changes? Or must some eco-disaster occur before they will face the facts?

Sicco Mansholt: What's happening in Africa right now is a disaster. So is the disappearance of plant and animal species in Europe, and so many other negative processes. I had hoped that man would use his reason, but he does not seem to. I had hoped that such a programme could be put into effect before a disaster. But when you ask me what I really feel, I don't think it is possible without a disaster. Only then will politicians and the people start to act as they should be doing now.





"When I came away from the mountains after a week's stay with the watchmakers, my views upon socialism were settled. I was an anarchist". The writer of those words was a Russian prince, Peter Kropotkin: the year was 1872, when he was thirty years old. Here, clearly was someone very much out of the general run of Tsarist Russian princes: indeed, no theory of heredity or environment can adequately explain how Kropotkin turned out the way he did. His early life had been a fairly conventional one. His father was rich, the owner of a thousand serfs; the family divided their time between a town house in Moscow and their country estates; when he was fifteen Peter entered the Corps of Pages, the most select military academy in Russia; he was clearly destined for a career as an army officer. But already by the age of twenty his interest in science and radical politics had disillusioned him with military life. He therefore got himself posted to eastern Siberia, near the Chinese frontier, hoping that in this remote region he would have greater freedom to pursue his own enthusiasms. Here he undertook a number of journeys of exploration, travelling a total of about 50,000 miles, mostly on horseback. His obserRadio Hulton Picture Library

vations on these expeditions led to his chief contribution to science-a revolutionary theory on the geological structure of the Asian continent, which in its essentials is still accepted today. But more important to his subsequent intellectual development were his anthropological and zoological observations. He encountered many primitive peoples and began to see that men are naturally friendly and without the interference of laws and governments; and he was led to question the Darwinians' emphasis on competition and struggle, between animals of the same species, as a factor in evolution.

In 1867, Kropotkin finally left the army, sickened by the brutalities of the Tsarist regime. For the next few years he took refuge in scholarship, particularly geographical studies; he became interested in the history of climatic change especially the Ice Age and the period of gradual desiccation which he argued was following from it. (His warning to the world of "the coming drought" sounds remarkably relevant today as do his suggested remedies such as large-scale tree planting). But conscience would not allow him to pursue an academic life for long: in 1871 he decided to devote himself to the cause of social reform. In Russia at

# PETER KROPOTKIN

The Anarchist Prince by Nicholas Gould

The idea that anarchists are desperate men seeking to transform society through violent acts against the state and those established in the seats of power is very far from the truth, as the *Ecologist* has already indicated in this year's March/ April issue. Kropotkin stands out as an anarchist revolutionary who abhorred violence.

"Mutual aid" was his theme, and it was his dream that men could live together—as they do in primitive tribes—without either the need to enforce laws or the domination of one man by another.

that time, reform could mean nothing less than revolution: so Kropotkin went abroad to clarify his ideas by meeting revolutionaries of western Europe. The international socialist movement was then in the process of splitting into two irreconcilable factions, which may loosely be described as Marxists and libertarians. It did not take Kropotkin long to see where his loyalties lay: a brief visit to the decentralised and egalitarian watchmakers' federation in the Swiss jura clinched the matter, leading him to the decision with which I began this article.

Kropotkin returned to Russia a committed anarchist, and threw himself wholeheartedly into the role of a professional revolutionary. Predictably this led to his arrest and imprisonment: but after two years his friends organised his escape from prison, and from Russia. He was not to return there until 1917. I will not deal in detail with his life in exile. It included another three years in prison, this time in France: but from 1886 to 1917 he made his home in England, where he settled down to a respectable life as a writer, on friendly terms with a wide intellectual circle including many wellknown figures. His ideals were unchanged: but being now middle-aged,

weakened in health by his years in prison, and unwilling to risk expulsion from England, his final refuge, he decided he could best serve the cause of anarchism as a theoritician and propagandist.

#### Plea for decentralisation

Kropotkin's propaganda differs from most of its genre in both readability and factual content. He sets himself the task of placing anarchism on a firm, theoretical and scientific basis. He does not harangue his readers; his manner is good-natured, courteous, overwhelmingly erudite. His main works have stood the test of time remarkably well: they are all currently in print in English, and their relevance is as great as ever. His main importance for our purposes is that he was probably the first writer to attempt a detailed analysis of decentralisation as the best way ahead for human society. Kropotkin was an optimist, or perhaps he was merely ahead of his time, for he seems to have believed that the world was going his way. Many of his arguments were intended to show that decentralisation was not merely desirable but inevitable. The arguments look valid enough, but the changes they predict seem to be a long time coming. For example, he anticipates a time when the food-exporting countries will prefer to keep what they produce for their own consumption. "Since all our middle-class civilisation is based on the exploitation of inferior races and countries with less advanced industrial systems, the Revolution will confer a boon at the very outset, by menacing that 'civilisation'. and allowing the so-called inferior races to free themselves. But this great benefit will manifest itself by a steady and marked diminution of the food supplies pouring into the great cities of western Europe". Nor was revolution the necessary catalyst of this process: economic forces already set in motion would bring about the same end. Orthodox 19th century economists, Kropotkin says, saw the future in terms of growing specialisation among nations: "Humanity was to be divided into national workshops, each having its speciality. Russia, we were taught, was destined by nature to grow corn; England to spin cotton; Belgium to weave cloth ... Economists believed that specialisation opened up an immense field for production and consumption, and that a period of limitless wealth for mankind was at hand". He goes on to imply that economists have now seen the error of their ways: that everyone now knows that the traditional exporters of raw materials are beginning to set up industries of their own; and consequently that Britain and others like her had better abandon the idea that they can live forever by exporting manufactured goods, and start learning to be self-sufficient while there is yet time. Obviously Kropotkin was too optimistic: those orthodox economists cannot have been as dead as he had thought in the 1890s-at least to judge by the number who are still around in the 197.0s! And plenty of nations are still specialising, in bananas or sugar, or copper, or cocoa. So where did Kropotkin go wrong?

#### Kropotkin was probably the first writer to attempt a detailed analysis of decentralisation as the best way ahead for human society

Wherever he went wrong, the next stage in his argument remains valid for Britain. Raw materials are becoming increasingly difficult to obtain: self-sufficiency today looks desirable, and tomorrow may be necessity. Kropotkin firmly believed that Britain could feed herself, and devoted the first half of Fields. Factories and Workshops (1898) to providing this thesis. He was writing at a time of agricultural slump: but though his statistics are out of date, his arguments are not. The malaise of our agriculture was caused by "the desertion, the abandonment of the land. Each crop requiring human labour has had its area reduced ... Far from being over-populated, the fields of Britain are starved of human labour". In Middlesex, Kropotkin could walk five miles through meadows "on which they hardly cropped two tons of hay per acre-scarcely enough to keep alive one milch cow on each two acres... And that, within ten miles from Charing Cross, close to a city with 5,000,000 inhabitants, supplied with Flemish and Jersey potatoes, French salads and Canadian apples". He contrasts this with the intensive food production in the market-gardens of France, the Channel Islands and other areas. Kropotkin was a keen gardener himself; he had grown vegetables in a French prison, and grapes

in a London suburb; and his enthusiasm for the achievements of the market-gardeners is inspiring. They "have created a totally new agriculture... Their ambition is to have six and nine crops from the very same plot of land during the twelve months. They do not understand our talk about good and bad soils, because they make the soil themselves"-with manure, seaweed, compost, whatever was locally available. "But the Paris gardener not only defies the soil-he would grow the same crops on an asphalt pavement -he defies climate", by the use of glass, soil-heating pipes and the like. By these methods one market-garden near Paris, of a little under three acres, and worked by eight men (working much too hard, says Kropotkin; better to let two dozen men work it for four hours a day each), produces in a year nearly 10 tons of carrots, nearly 10 tons of onions, 6,000 cabbages, 3,000 cauliflowers, 5,000 baskets of tomatoes, 5,000 dozen apples and other fruit, 154,000 lettuces-in other words, he ends triumphantly, vegetables and fruit sufficient for 350 people. (Including, one might add, enough lettuce to put them all off the stuff for life!)

I cannot quote any more of his examples: in any case, as Kropotkin would have been the first to predict, many of them fall far short of presentday possibilities. What is important is that our increased knowledge strengthens his general conclusions that "if the population of this country came to be doubled, all that would be required for producing food for 90 million inhabitants would be to cultivate the soil as it is cultivated in the best farms... and to utilise some meadows which at present lie almost unproductive, in the same way as the neighbourhoods of the big cities of France are utilised for market-gardening". In Britain today we have roughly an acre of land per person, and produce half our own food: the Dutch with 3-acre each, but a more "Kropotkinian" agriculture, produce 50 per cent more food than they need. A British farmer might object that their land is better, but Kropotkin would have none of that-land is what you make it. "The most fertile soils are not in the prairies of America, nor in the Russian steppes; they are in the peat bogs of Ireland, on the sand downs of the northern sea-coast of France, on the craggy mountains of the Rhine, where they have been made by men's hands."

#### The dangers of specialisation

The vast increase in agricultural manhours could best be achieved, in Kropotkin's opinion, by making farming a part-time occupation for most of the population. He rightly pointed out that the separation of agriculture from industry was a modern phenomenonindeed, in his day, Britain was almost the only country where the separation was already all but complete. Elsewhere in Europe millions of people still lived as peasant-craftsmen in the traditional way, virtually ignored by the orthodox economists, who noticed this industrial underground only to predict its imminent collapse. Kropotkin assumed, too optimistically as usual, that its virtues would ensure its survival. His main argument in favour of small decentralised industries, however, was a moral or social one-only thus was industry compatible with human happiness, with a just and free society. (He might have added with a society which made *politics* obsolete.) But he was enough of a realist to see that his moral convictions must be backed by sound economic reasoning: most people will only do what is right if they are persuaded that the material rewards will equal those of doing wrong! So Kropotkin was at pains to emphasise the efficiency of economic decentralisation. The Industrial Revolution had been founded on the principle of "division of labour": the theory that increased specialisation meant increased efficiency. The fallacy here was that people, unlike machines, needed to be happy to work well. "The ideal of modern industry is a child tending a machine that he cannot and must not understand ... The ideal of industrial agriculture is to do away with the agricultural labourer altogether and to set a man who does odd jobs to tend a steam plough or a threshing machine. The division of labour means labelling and stamping men for life-some to splice ropes in factories, some to be foremen in a business, others to shove huge coal baskets in a mine; but none of them to have any idea as a whole of machinery, nor of business, nor of mines. And thereby they destroy the love of work and the capacity for invention that at the beginning of modern industry,

created the machine on which we pride ourselves so much."

Kropotkin was not immune from the 19th century enthusiasm for machinerv: but he saw, as few did at that time, that the all-important factor is the scale of mechanisation. Consequently he welcomed electricity as a means of distributing power easily to any number of separate places, and so making the centralisation of earlier coal-based industrialism obsolete. Large scale, he admitted, is necessary to some industries: "oceanic steamers cannot be built in village factories" (though he does ask whether oceanic steamers are needed anyway); but more often than not "big factories are nothing else but agglomerations ... of several distinct industries, or ... of hundreds of copies of the same machine".' Most industries, he concludes, are centralised for historical and commercial reasons, not for technical ones. The relocation of industry into small units throughout the countryside would therefore be economically quite feasible; moreover agriculture would benefit from the dispersal of technical skills, and the availability of extra labour for seasonal work and schemes of long-term improvement; above all the individual workers would be healthier and happier, the divisions between town and country, and between brain work and hand work, would be broken down, the gulf between producers and consumers would disappear, and the units of society would be reduced to a size within which real freedom and a sense of community could flourish.

#### **Mutual co-operation**

The criticism most frequently levelled against anarchism as a practical philosophy is that it fails to take account of the anti-social element in human nature. In another of his bestknown works, Mutual Aid (1902), Kropotkin tried to meet this objection by offering zoological, anthropological and historical evidence for the central place of co-operation rather than competition, in animal and human life. The book began as a response to an essay by T. H. Huxley on "The Struggle for Existence", in which Huxley compared the animal world to a gladiatorial show-"the strongest, the swiftest, and the cunningest live to fight another day... No quarter is given" -and said of primitive man "Life was

a continuous free fight, and beyond the limited and temporary relations of the family, the Hobbesian war of each against all was the normal state of existence". Kropotkin's observations of animals and primitive people in Siberia had shown him that Huxley's views were very nearly the opposite of the truth: and in Mutual Aid he drew on a vast number of authorities to support the contention that the "fittest to survive" are not the ruthlessly competitive but the mutually co-operative. His examples range from the burying beetles (Necrophorus) which bury dead animals to lay their eggs in, and when necessary work together to bury a corpse too large for one individual to handle, to pelicans swimming abreast to drive shoals of fish into the corner of a bay, and wild horses uniting to repulse the attacks of wolf or bear. The most numerous and successful species were precisely those with the most highly developed instinct to co-operate. It would be very strange, he argued, if man were the exception to so general a rule-"if a creature so defenceless as man was at his beginnings should have found his protection and his way to progress, not in mutual support, like other animals, but in a reckless competition for personal advantages, with no regard to the interests of the species." The evidence of dozens of explorers and anthropologists confirmed Kropotkin's contention that the "savage" of popular European belief is a creature of fiction: their accounts of the primitive tribes they had met and studied were full of words like "gentle", "honest", "sociable", "affectionate". Kropotkin was particularly delighted with the unforced communism of the most materially backward peoples-like the Hottentot, who "cannot eat alone, and, however hungry, calls those who pass by to share his food", or the Aleut, who if he grows rich "convokes the folk of his clan to a great festival and ... distributes among them all his fortune". Even the practice of infanticide, Kropotkin found, was far from indicating any lack of humane feelings: it was performed as a cruel necessity, an obligation to the community and to one's existing children when food was in short supply.

The book goes on to trace the theme of mutual aid through history. Kropotkin lays particular emphasis on the free cities of the Middle Ages, and the guilds within those cities: for these were models of the small-scale social and economic structure which he saw as an ideal for the future. Essentially, he regarded the rise of unified nationstates from the 16th to the 19th centuries as an aberration, a backwater rather than the main stream of historical progress. But even in 19th century Europe he thought he could see portents of a more natural society. in the growth of voluntary organisations and the provision of free services to the community as a whole. The picture he draws in Mutual Aid is one-sided: this he admits, but justifies it as a deliberate antidote to the prevailing "individualistic" school of thought. The apology is hardly necessary today: for the book was ahead of

#### THE SELF RELIANCE NEWSLETTER

The Self Reliance Newsletter is for people who are interested in individual or small group subsistence-or survival-who feel that they suffer from an excessive dependence on our modern technological society and who have reservations about the direction society is taking. It is designed to provide information and help to people planning to pursue, or pursuing, one of a wide range of strategies ranging from the varying of one's circumstances in a number of ways in order to reduce one's dependence, to completely opting out from society as individuals, family groups or in communities. The subject areas covered include food, energy, materials, equipment, manufacture and health. The newsletter provides personal contacts for moral support and practical associations, references to information and sources of information, services and equipment available. and articles on topics of interest.

The venture is non-profit making. The £1.00 subscription is to cover the printing and distribution costs. Subscribers are encouraged to contribute ideas and information and to use the newsletter for making contacts with like minded people. If you would like to have more information please send a S.A.E. to Colin Richardson, 29 Dartmouth Ave., Huddersfield.

its time in all the subjects it dealt with —in zoology, by its emphasis on the social behaviour of animals, in anthropology, by its attempt to see different human cultures from their own point of view, and in history, by its concentration upon the organisation of everyday life underlying and outlasting the antics of the rich and powerful.

Nevertheless, the charge that Kropotkin was over-optimistic is not easy to refute. Despite his revolutionary views he is in many ways a typical product of his age: his faith in progress and the beneficent power of science remind one at times of H. G. Wells. Even more, however, his opinions were conditioned by his temperament. He was himself the most gentle and reasonable of men, incapable of imagining the depths of cruelty and irrationality of which human beings are capable. If there were no more to Kropotkin than this, we could afford to ignore him. But his ideals rest on a basis of facts. His Utopia is made up of elements from his own experience-from the Russian village communities, the Tungus tribesmen of Siberia, the peasant-watchmakers of Switzerland, the market-gardeners of the Channel Islands-backed by meticulous and extensive research. Blind optimism is a fault: but farsighted optimism based on a sound knowledge of the natural world and the capabilities of mankind, is a virtue that our cynical age would do well to re-learn from Kropotkin, the anarchist prince.

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### THIS MONTH'S AUTHORS

Amilcar Cabral was Secretary-General of the PAIGC until his assassination on January 20, 1973. He worked for more than a decade for the liberation of Guinea/ Bissau, a goal which was realised eight months after his death.

Henrik Skolimowski is a professor of Philosophy in the Department of Humanities, Michigan University. His main interest is the development of a post-technological ethic and a post-industrial society.

Vanya Walker-Leigh is a free-lance journalist who lives in Geneva and specialises in environmental problems.

Nicholas Gould is a free-lance writer with a particular interest in traditional agriculture and the development of Ecological thinking.

Lawrence Hills is the Founder of the Henry Doubleday Research Association, writer, lecturer and promoter of ecologically sound principles in horticulture and agriculture.

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# SHOULD WE EAT KRILL?

by Barry Bondar and P. J. Bobey.

The world's oceans are grossly over fished and as the traditional species become scarcer – new sources of marine food are being researched. Among the most recent to come under scrutiny are oceanic zooplankton or krill. In this article two Canadian students examine the possible benefits to be derived from a large scale use of krill against the probable ecological cost resulting from such a radical interference with the oceans' ecosystems.

Using recent technological improvements several governments are now on the way to creating a viable zooplankton harvesting process and it is time to look at both the benefits and the dangers of such an operation.

Perhaps the most important zooplankton type presently considered for harvest is commonly called "krill". Of the various worldwide species of krill which exist, only the Antarctic species, *Euphausia superba* has the qualities which make for economical harvesting. These include an adequate size for efficient capture, being plentiful and continually concentrated into swarms as well as having a good protein content.

The nutritive value of krill is high. On a dry matter basis, samples of E. superba were found to contain 24.6 per cent lipid, 49 per cent protein, 2.5 per cent chitin and 9.8 per cent ash. The krill is also high in vitamins A and B as well as in essential amino acids like arginine, lysine, leucine and phenylalanine. Other substances such as potassium, iron, manganese and zinc are also present. Perhaps the most important factor in the economic harvesting of this form of krill is the fact that they aggregate into distinct lens-shaped swarms through-out every known phase of their life cycles.5 It appears that crustaceans of various age classes differ fairly well in their size and generally do not mix,6 which means that each swarm generally consists of only one specific age and size group.

Since the *Euphausia superba* has a life span of over four years, there are usually four types characterized by the length of the organisms within each unit. Although the patches vary in size from 0.5 by 1 metre up to 150 by 400 metres, the fact that this form of krill constantly swarms means that units of comparatively dense concentration can be harvested.

#### **High costs**

High costs are inevitable. In the first place there is the sheer distance that a fleet must travel in order to reach the Antarctic; ships must be equipped with some form of processing plant on board since spoilage is high within forty-eight hours, and much research must already have been done so that the fishermen can predict the location and swarming activities of the krill. Visual as well as hydro-acoustic observations are used in tracking down krill, which tend to be found in areas with circular water movements.7 The main surface swarms are most commonly present in the area of the Scotia Sea where the Weddell Sea waters closely approach the warmer waters of the West Wind Drift. But there are a wide variety of environmental factors ond intrinsic Euphausiid behavioural patterns which create unpredictable swarming patterns.

Generally, the largest catches are obtained during the day in the continental shelf regions by towing the net close to the bottom. During the night, the vertical migrations of the euphausiide disperse the organisms throughout the vertical water column. Catches are also affected by temperature change. It has been observed that commercial concentrations of krill are often found where the temperature is close to 3.5°C.

Krill constitutes the main diet of whales

Due to the unpredictability of the Euphausiid patches, new methods have been attempted to induce swarms of krill to concentrate in dense enough units for commercial harvesting. Stasenko (1967)<sup>8</sup> and Semenov (1969)<sup>9</sup> have indicated that Euphausia superba moves toward dim light regardless of the colour. Night fishing using large spotlights directed toward the water's surface can therefore locate and increase the density of surface swarms. Generally, side trawls, fish pumps or towed nets of varying sizes (depending upon what size range of krill is desired) are the main devices used for the collection of the krill.<sup>10,11</sup> Light lures may also be used in areas of weak surface currents by attaching lights to floating buoys thereby attracting dense swarms of euphausiids. A scoop net can then be dropped around the swarm and closed beneath it. Initial experiments on the reactions of Euphausiides to electrical fishing methods are also being carried out.11

At present, several countries are involved in the experimental use of krill, although this is as yet on a limited basis. The U.S.S.R. has recently advanced a 10 per cent krill and 90 per cent cheese mixture to the consumer

market under the brand name "Korall" and states that the product is selling well.1 Furthermore, feeding trails of krill on young pigs by Soviet scientists have shown that the material can be used as a high quality animal feed.10 In countries such as Canada and the United States where sea foods do not constitute a major part of the diet, krill would most likely be used as an additional source of animal feed. In addition, Euphausiids used for direct human consumption have long been collected on a small scale by Japanese fishermen and have been boiled, dried in the sun and mixed with rice to produce a rice cake known as 'Tsukudani'.10 Other countries presently involved on a small scale include Norway and Canada where the krill captured is used as bait, food for trout or other "farmed" fish or as a pet food.10 If technological considerations and problems can be solved, it appears that krill can form a viable commercially exploitable resource.

What we must now consider is the total amount of krill which can safely be removed from the Antarctic ecosystem. At present there is no reliable data on the productivity of the krill in the Antarctic, except for several rough estimates such as those made by J. A. Gulland (1970).12 Based on a 10 per cent efficiency in energy transfer from the phytoplankton to the herbivorous krill, an annual production of some 500 million tons was calculated. A second estimate was based upon the standing crop biomass and a one year life span which resulted in a productivity of approximately 75 million tons. K. Radway Allen (1971)<sup>13</sup> later revalued this data to a level of 150 million tons taking into account the four year life span of Euphausia superba. As a result, only extremely crude values for both the productivity and the standing crop biomass can be obtained until extensive studies have been undertaken.

Since virtually nothing is known of the biotic or the abiotic factors controlling the abundance of the krill, it has been suggested by MacKintosh (1971)<sup>14</sup> and others that man should for the time being simply take over the role vacated by the greatly reduced baleen, sei, minke, and right whales in an attempt to utilise the expected surplus of krill. The surplus has been calculated to be not less than 30 million tons and may very well be more but no data is available to show that such an increase has actually occurred. It has further been pointed out that the reduction or removal of a consumer does not inevitably result in a surplus of the food.14 Dr. B. Stonehouse has shown that it is unwise to assume that the removal of the whales has necessarily left a gap in the ecosystem that man can fill. Indeed, there may have been a compensating increase in the numbers of birds, crab eater seals, smaller minke whales, antarctic fish or squid populations to counteract the space left by reduced whale stocks. Later work by Mac-Kintosh (1970)<sup>15</sup> has indicated that minke whales and crab eater seals do not appear to have increased greatly and that the excess krill, if any, could be being absorbed by fish or squid or by the carnivorous zooplankton which feeds on krill.

#### Once an industry with huge capital investment has developed it is often too late to exercise effective control.

Recent studies have shown that the ability of krill to form vast concentrations in the pelagic waters of the Antarctic and its availability to the organisms which feed on it mark it as a principle link in the complex trophic interactions of the Antarctic.16 Indeed, krill has been found in the stomachs of thirty-one fish species belonging to twelve families of Antarctic, Subantarctic and even migratory subtropical fish.<sup>17</sup> It also constitutes the main diet of such organisms as whalebone whales crab eater seals, penguins and migratory birds. The Euphausia superba, therefore, is a critical link between the primary and the predatory levels of the Antarctic food chain.

The experience of whaling has shown that once an industry with huge capital investment has developed it is often too late to exercise effective control (indeed Dr G. G. L. Bertram suggests that in the long term, the cheapest way of harvesting the krill may be to allow whales to recover and then to crop them again). At present the world has a totally inadequate legal frame-work governing the ownership of high sea resources such as fisheries. For this reason, immediate attempts must be made to set up international regulations to protect the highly dynamic Antarctic ecosystem, before exploitation begins.

All the facts lead us to the conclusion that no large scale harvesting of krill should be allowed until the ecological implications of such harvesting have been studied in depth and international treaties based on such studies have been agreed by every nation involved.

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### Sward Gardening by Lawrence D. Hills

In terms of energy, the American maize farmers who grow just this one crop year after year, are the most inefficient food producers in the world. They spend five calories of fossil fuel for tractors, and making machinery and spares, pesticides, fungicides, herbicides and ever increasing quantities of fertilisers for every calorie of food they grow.

At the other end of the scale are the Tsembaga of New Guinea\* who support sixty-four people a square mile on a system of gardening and pig keeping known to anthropologists as "swiddening". They live entirely on the income of their land in sun and rain, five degrees south of the Equator, using no fossil fuel at all and nothing that is exhaustible. Theirs is a stable ecosystem, survival gardening that has survived through sunlit centuries and will survive when our farms are starved of fuel and fertilisers within forty years. Once our natural nitrogen deposits are exhausted we must spend five tons of petrol equivalent to make one ton of nitrogen fertiliser, and if we go back to horses we have to give up a third of our land to grow the hay and oats to power them and rear their replacements.

The question is whether there is any form of "swiddening" that will fit our climate and reduce the energy we put into our gardening. We have time to experiment before rising fuel costs price the motor mowers off our greedy lawns and learn in perhaps twenty years the kind of detailed directions for ecological vegetable growing that the Tsembaga discovered about when King Alfred was burning the cakes.

The answer could well be "Sward Gardening", a variation on the wellknown "no-digging" system invented by Thomas Tony, a Welsh organic gardener, to apply the advantages of the herbal and legume lay used by organic farmers on a garden scale. Mr. Tony's idea is to sow wild white clover thickly enough to hold down all annual weeds, and to sow and plant crops through this semi-permanent lawn,

\* See the *Scientific American* Sept. 1971. "The flow of Energy in an Agricultural Society," by Roy A. Rappaport. Other experimenters have tried to use a legume ground cover to replace the wasteful bare soil with leaves absorbing 5 per cent of the sunlight and using a proportion of this to supply nitrogen fixed by the root bacteria to replace that supplied by manure or as a chemical fertiliser. The result has always been failure with a fall in yield, because the clover locks up phosphates and potash and does not release nitrogen enough to keep the crop going.

Mr. Tony saw the need to duplicate the effect of the grazing animal, and so he clipped his clover with garden shears, their handles bent at rightangles like edging shears, but aimed to cut flat between the rows. Some day perhaps there will be six inch wide hand mowers for this vastly easier task than lawn mowing, for clover stems are soft.

When cattle graze a pasture they reduce the leaf area of the clover which cuts down the carbohydrates available for the root bacteria, and these die out and release nitrates which act as a tonic for the crop, or the grass, until the clover leaves grow again and fixation expands. They take off the protein, carbohydrate, vitamins and minerals but about 90 per cent of the last, plus much of the rest is returned in the dung and urine for immediate recycling.

Only clip the clover and nothing is taken away in meat and milk. All the energy-providing carbohydrates and body-building proteins are in the soft leaves which are taken down by the earthworms, as grass is when you mow the lawn with the box off the mower. This rich food produces a great increase in Lumbricus terrestris, our commonest earthworms, which will drive deep into the subsoil bringing up more minerals and constantly top dressing the land with their casts. These are about five times as rich in nitrates, hold seven times the available phosphorus and as much as 11 times the available potash as the surrounding soil, because worms concentrate minerals from organic matter and have highly efficient digestive bacteria that specialise in making minerals usable.

Carrots and other roots grow well on this system, with rather more space between the rows than usual to prevent the clover being excessively shaded. A line of holes about six inches apart is made with a long dibber made from a fork handle, like one for leek planting, and these are filled with fine soil and sown with pinches of seed, thinned when they are well established to the largest. The object is to prevent the seedlings being strangled by the clover by giving them a flying start. They are dug by loosening with a fork, but both Cook's Delight beet which stands above the soil like a sausage, and onions from sets, simply lift off the surface.

The clover is sown at the rate of 1 oz. a square yard, mixed with sand so the small seed can be evenly scattered, and it should go on ground levelled and rolled like a lawn. Birds do not eat clover seed so there is no need to cover it or put up scarers, and the best sowing times are from February till April or July and August. It is possible to sow both crop and clover together in the spring, but this gives a less solid sward than a late summer start with cabbage tribe crops planted through it in autumn.

In theory the sward should last four years before it becomes patchy with "clover sickness" from the bacteriophage that attacks the nitrogen fixing bacteria. Then the aging sward, perhaps suffering from a build-up of perennial weeds, should by dug under, just as organic farmers plough up their lays in rotation and cash the hoarded fertility. Potatoes should crop wonderfully and could have the small quantity of compost that a weedless garden can supply from only crop wastes, for perhaps two years before the land returns to clover again.

There are many problems to solve and the main one is the experienced gardeners who can experiment effectively see so many of them that they never try, so only beginners attempt it. The second one is moles and it is their powerful underground movement which makes worm farming unprofitable in Britain—a black velvet population explosion. A thirty inch high wall or buried corrugated iron sheets on edge buried round the garden may be the answer.

At present Sward Gardening is a possibility which the amateur experimenters of the H.D.R.A. are exploring. Some day we might have to scale up the system for the market gardens of a vegetarian world, and we should have to catch up with the Tsembaga sooner than we think.

# **Information for Survival**

#### Energy

#### The Cost of Technology

An annual surplus of \$50,000 million (\$50 billion) is estimated for some oil producing countries. This surplus obviously represents the excess of what they sell over what they buy.

Turn now to deficits. When a single country plans to invest more than it can save—it can borrow. It can get hold of extra resources through a balance of payments deficit but it can only do so when someone will lend.

The outlook has been assessed by the British North American Committee. It has assessed investment requirements to secure energy—produced by nuclear stations, oil or coal. It sets these requirements at

| USA | say | \$1 | ,000, | billion |
|-----|-----|-----|-------|---------|
| UK  | šay | \$  | 75    | billion |
| EEC | say | \$  | 400   | billion |

These estimates relate to a period up to 1980. Even so, these global programmes are bigger than can be financed by the surpluses of the oil producing countries. Nor can all resources be allocated to investment. Capacity must be set aside to provide goods, if only for oil producers and others with finance.

Even in the current year the OPEC countries are expected to spend some \$15 billion on goods. The supplying countries need to meet this demand (which will represent their exports) and to do two further things. They must provide goods for their own people; they must also maintain and renew the means of production.

Anthony Harris. Financial Times, 25.4.74, p. 23.

Comment: These sums do not add up. In the event it will not be like that. What form will international trade, in the event, take? Ref: 000,639.

American energy companies are the beneficiaries of a panoply of subsidies. These have the effect of pricing energy below its full cost. These subsidies, which are paid for by taxes, impose a net transfer of income from those who use less than the average amount of energy to those who use more.

Sierra Club Bull. Feb. 1974, p. 20 Ref: 000,627.

#### Bookkeeping of World Oil

The oil revenues of the principal nonindustrialised oil-producing countries having risen from \$11,000 million in 1971 to more than twice as much in 1973 (to \$24 billion) may rise by another \$50-75 billion in 1974. The prospective increase in the annual earnings of the main oil producers is roughly equivalent to half the world's foreign exchange reserves. For many years some of the largest oil producers will be physically unable to spend their increased foreign exchange incomes on increased imports.

The oil importing countries as a whole cannot hope to sell enough abroad to pay for their oil needs.

Robert Collin. Financial Times, 22.4.74. Ref: 000,624.

Revalued at 1970 prices, the developed countries' trade gap is likely to come out at about \$80,000 million in 1974, a tenfold increase over the figure for four years ago. Our own current deficit reached an annual rate of \$10,000 million last month.

C. Gordon Tether. *Financial Times*, 23.4.74. Comment: It is becoming too costly to maintain the form of society to which we are addicted. Those who do not own oil seem committed to pawn their assets to those who do. Ref: 000.624.

#### The next crisis?

OECD and the International Atomic Energy Agency point out that capacity for enriching uranium will be saturated by 1983.

Already the present interest in nuclear energy has resulted in a price increase of 17 per cent—to \$17 per pound for deliveries of uranium for 1977-81 while 1979-82 deliveries are being quoted at \$12 per pound. N. M. Stewart; Letter to *The Times*, 20.2.74.

N. M. Stewart; Letter to *The Times*, 20.2.74. Ref: 000,628.

#### **Social Organisation**

#### All Fools' Day

On All Fools' Day 1974 Widnes & Runcorn were presented to Cheshire. The district which incorporated Runcorn New Town is the most urban in Cheshire. Of 32,000 houses 1,700 are unfit and another 4,000 below required standards.

Mersea is one of the most seriously polluted estuaries in Britain. The River Mersea is highly polluted before entering the estuary where it recieves further polluting materials. Almost all the streams which join the estuary are similarly grossly polluted. The largest is Ditto Brook which in dry weather has a flow which is 90 per cent sewage effluent. Chemical manufacturers account for 30 per cent of the major employers-ICI is the most important-and of the 48 largest firms 21 are engaged in industrial processes that are noxious. In Widnes itself, 57 per cent of the firms are doing work officially classified as noxious. The Times, 10.4.74. Ref: 000,635.

#### Land Surface

#### The Village Pond

The village pond is rapidly disappearing. Some 100,000 have gone since the war and the rate of disappearance of the remaining 200,000 is a hundred a week. Michael Hornell. *The Times*, 7.3.74.

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#### **Scottish Crofts**

The Crofters' Commission "cannot accept a policy of opposition to industrial development based on the proposition, whether explicit or implicit, that the Highlands and Islands should remain as they are for the enjoyment of urban holiday makers and nature lovers; with the inescapable corollary that the crofting population must do with a depressed standard of living or migrate.

J. S. Grant. Letter to *The Times*, 12.2.74. Ref: 000,630.

#### Inland Waters

#### Senegal

The drought below the Sahara has been much publicised. At Dagana, nearly 200 miles from the sea, the water is salt because so little water is now coming down the stream. This is one of the major rivers of Africa and is 300 yards wide at this point.

Before this drought the banks of the river were amongst the most fertile regions in the country. Every year they could count on two harvests, one when the river overflowed leaving a rich alluvial soil, and again in the rainy season. It has now been four years since the people have known even one harvest.

Martin Walker. The Guardian, 29.3.74. Ref: 000,634.

#### Below the Sahara

Since last November, there has been further devastation among the human and animal populations of the Sahelian countries— Mauritania, Senegal, Upper Volta, Mali, Niger and Chad. Livestock herds that last year suffered losses up to 80 per cent in some areas, have been further decimated. Nomadic herdsmen, helpless without their animals, have drifted into relief camps or are huddled around already impoverished towns. FAO officials report that large numbers of malnourished people, particularly in Niger and Mali, are threatened through disease, or, if food does not arrive on time, starvation.

FAO Press Release. 74/25 5.4.74. Ref: 000,625.

#### Sugar Cane Paper

Canada, Finland and Britain have offered to finance a factory to produce newsprint from crushed sugar cane waste—at Trujillo, north of Lima in Peru.

The Times, 8.4.74. Ref: 000,629.

#### The Cost of Shale Oil

The price of a barrel of oil from the Gulf is of the order of \$10.

The US Geological Survey estimates the petroleum in shale in Colorado, Utah and Wyoming at something in excess of 600 billion barrels—in rock containing more than 25 gallons per ton. Today's most advanced mining technology could extract something like two thirds of that figure although 40 per cent usable oil is perhaps more likely.

In November 1973 tenders were put in the lease of public lands in the premier area in Colorado. Standard and Gulf won this first and richest lease. The Department of the Interior estimates the reserves in this first lease at 4 to 5 billion barrels (equivalent to

two-thirds of the reserves of the East Texas-Louisiana-Oklahoma fields-the mainstay of the insatiable US economy for decades.)

The accepted tender amounts to a "piddling" five cents per barrel.

There also appears to be an arrangement whereby public lands, not included in the 5,120 acre site, are to be used without cost as "garbage pits for the shale wastes of the private shale oil developers."

David Sumner and Carolyn Johnson. Sierra Club Bull March '74, Vol. 59, No. 3. pp. 11-14. Ref: 000,640.

#### Waste from fuel hydrogen

A research chemist working for the Monsanto company has looked into the burning of hydrogen as fuel. It is alleged to burn to water. His research shows that in an internal combustion engine at 1,750 rpm, fuel hydrogen gives measurable quantities of hydrogen peroxide. This is a reactive compound which interacts with other molecules to produce so-called free radicals which could be harmful if inhaled.

Nature-Times news service. The Times, 2.4.74. Ref: 000,632.

#### Nuclear Wastes

An urgent inquiry into the safety and disposal of radioactive waste from nuclear power stations is being made by the Royal Commission on Environment Pollution. The waste contains long-lived isotopes which remain radioactive for millenia. The Times, 20-3-74. Ref: 000,633.

#### Plutonium

Plutonium is produced in all nuclear reactors and is one of the most hazardous known substances. It is proposed as the fuel for breeder reactors and its increasing use will result in the transport, storage, and control of enormous quantities of potentially dangerous material.

Anthony Tucker. The Guardian, 20.3.74. Ref: 000,637.

#### **Transport of Natural Gas**

One theoretical way of carrying natural gas is by airship. This is not necessarily more dangerous than carrying it by sea. The means, known locally as the technology, are being studied by Aerospace Developments. Hopes rest on 1985 at a cost of £25 million at present day costs.

Charles Cook; The Guardian, 26.3.74. Ref: 000,638.

#### Seas and Oceans

#### **Oil Spills**

The Field Studies' Council's research studied effects of oil spill following the wrecking of a Liberian tanker. The oil, and detergent, cause limpets to loose their hold on rocks and they fall off whereupon the birds eat them. Since limpets eat seaweed, the seaweed is the winner. Its luxuriance then prevents fish and birds entering the habitat.

Michael Morris. The Guardian, 1.4.74. Ref: 000,636.

Compiled by Dr. Kenneth Barlow.

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\*One of the oldest colonies of the Atlantic Grey Seal in Britain.



#### **Ethiopia Sell-Out**

Ethiopia differs from all but a handful of the nations of the Third World in that it has contrived to avoid and resist direct colonial rule, excepting only the brief interlude of Italian domination 1936-1941. It may not be coincidental, therefore, that it has been defined as one of the poorest and least developed states of Africa, for in protecting itself from foreign domination it has necessarily viewed with suspicion the infiltration of foreign ideas and technology. The present situation, however, argues that a change has occurred under the unrelenting pressure of the developed countries, forcing Ethiopia into a situation similar to former colonial possessions. Ethiopia seems to have accepted the analysis that she is in fact poor and underdeveloped, and consequently in need of economic aid and expert advice. One must ask whether this poverty is actual or only relative, and whether the acceptance of external judgements on Ethiopia's needs enwraps the country in the coils of a development which is neither to its own economic or cultural benefit nor conducive to its continued independence.

The attitude of many of the Developed Nations more often than not implies that Ethiopia has needs which it is not enlightened enough to recognise for itself, and which only the Developed countries can supply. To help the country acquire these extra needs, the metropolitan Nations have deemed it necessary to undertake a policy of economic assistance; "Aid is given basically because the raising of economic standards of less Developed countries is considered to be in the long term interest of Britain, as of all the more developed countries of the world, and also because it is

thought morally right to help those in need".<sup>1</sup> Which is, perhaps, akin to saying that a fish is unhappy in water because it is wet—and that the net is a helping hand. It would appear that Ethiopia is being given aspirations it cannot meet, and artificially inseminated needs it does not require—whilst simultaneously being milked of its resources.

The primary aspiration embodied in the concept of Development is "rapid and sustained economic growth. The building of hydro-electric and irrigation projects, the application of improved technology, more fertilisers and capital equipment on farms is essential if Africans are to produce for themselves the economic base for a modern and dynamic African Society."2 In short, the paradigm for Africa is defined as the economic values of the Developed Countries. Without the internal capital to imitate foreign achievements, Ethiopia is obliged to rely on foreign grants, loans and investments. The extent to which these are conducive to the well-being of the mass of Ethiopians is, however, extremely doubtful, e.g. US AID loan of \$10m for the development of Addis Ababa and Asmara International Airports:3 British loan of Eth\$ 4.5m for port equipment for Massawa and Assab.<sup>4</sup> It should be noted that up to 30 June 1971 only 3.5 per cent of all foreign loans had been utilised in agriculture in which the majority of the population is occupied.

On the face of it loans would appear to be a form of assistance from the Developed Nations. This appearance could hardly be more deceptive. More often than not Aid is motivated for political and economic reasons and bears a greater correlation to the policy requirements of the Donor Nations than those of Ethiopia. S. Nwosu quotes an official of the various US Foreign Aid Agencies as saying: "The object... (of Foreign Aid)... may be to buy a base or obtain a

favourable vote in the UN or keep a Nation from falling apart (prevent Revolution) or to keep some countries from giving airbase rights to the Russians-or any one of many other reasons".5 This is borne out by the role played by the US in the attempted coup of 1960, and by military Aid given to Ethiopia in relation to the rest of Africa; 50 per cent of US military Assistance to Africa is spent on Ethiopia.6 Indeed, with the spreading polarisation over the Middle East, and the Communist entente with Somalia. the rationale behind US AID is easily discernible. Other reasons are typified by the policy of the British Government; "About two-thirds of the total of British Grants and Loans are tied, in whole or in part, to the supply of British goods and services".7

The need to repay loans has forced Ethiopia into a policy of Economic Growth; "even with exports expanding at the high rate of 8.5 per cent, the projected foreign exchange gap is still quite large, implying a gross capital inflow over the five years of the plan culminating in over \$1,000 million. After allowing for foreign loan repayments this would imply an increase in net foreign indebtedness of the country from less than \$600 million today to more than \$1,400 million at the conclusion of the plan period (1978)".8 Although the dominant objective of economic development is "a perceptible and steady increase in the wellbeing of the Ethiopian people"9 and "a more equitable distribution of the fruits of this development",10 it nonetheless has to be recognised that higher growth rates are normally associated with "higher standards of living" which in turn demands a higher level of imports, thus perpetuating the situation which made growth necessary in the first place. "An increase in the level of exports would itself tend to raise the level of output and of imports, but for any pattern of export growth, a higher level of growth in



"THEY'RE GREAT BELIEVERS IN GROWTH FOR SURVIVAL!"

total output would be associated with a more rapid growth of imports, and therefore with a larger balance of payments deficit ... To cover this the country would again require foreign finance".11 The circle is a vicious one. Moreover, the sharply fluctuating terms of trade, the range of tariff and non-tariff barriers which the Developed countries erect against the output of manufactured goods from the developing countries all impinge on the stability of Ethiopia's export markets,12 further the trade imbalance between the developed countries and Ethiopia-an imbalance which is already considerable. Not that the developed countries are uninterested in the exports Ethiopia has to offer. Japanese interests in Ethiopia have centred on her mineral wealth; a joint venture is being undertaken to develop her resources-the Japanese firms having 80 per cent control. Canadian interests hold concessions in the Lake Langano area to exploit diatomaceous earth deposits, and are seeking concessions to extract mercury in the Awash Valley.13 The Israelis have concessions to mine atomic minerals in Hararge. "There is a need for further exploration and development of other industrial minerals in short supply in Ethiopia and/or which have an export potential".14 The situation is similar to an alcoholic who prolongs and increases his addiction by selling his blood to hospitals. Far from preserving her natural wealth for her own use, Ethiopia must export it.

Any policy of economic growth automatically entails an increase in production. It is not surprising that traditional agriculture is therefore viewed as "the first and most obvious" internal constraint on the "progress" of the country.15 The aspiration is the modernisation and monetisation of traditional agricultural methods, and the encouragement of a cash-crop, as opposed to a subsistence economy, often resulting in the displacement of tenant farmers and nomads. One of the suggestions of the US AID agency is "to focus efforts on selected crops and areas with strongest potential for high yields, production of income and export application".16 Whereas traditional agriculture is based on worksharing and on the effort towards selfsufficiency in the village or community, the exigencies of large-scale monocrop farming entails a wage earning

force on a capital rather than labour intensive basis. Those who do enter into the modern system are consequently defined as underemployed, while those forced to leave the land in order to exist in the monied economy often become part of a hitherto unknown but burgeoning group, the unemployed. The search for jobs, the qualifications needed to obtain them, and the newly-implanted aspirations endemic in the concept of development, have resulted in the increasing migration towards, and the rapid growth of towns, particularly Addis Ababa. Thus, although the degree of urbanisation is slightly lower in Ethiopia than in East Africa, the proportion of the urban population living in cities is relatively high, and Addis Ababa (pop. 900,000 by the end of 1971) is the biggest city in Central and East Africa, with a yearly growth rate of 7.6 per cent.17

With the growth of cities come the inevitable urban problems, and a future setting for instability and social disintegration; "the element for disappearing particularly content is amongst school-going youngsters, and there is evidence that the traditional regard for authority and tolerance in terms of pace of change is breaking down. The increase ... of education (which seems largely to ignore social education) and the advent of television and like amenities may increase this trend".18 The symptoms of a lacuna in the social structure are further indicated by the presence of hordes of street boys, the large-scale practice of prostitution, and the growing incidence of delinquency.

"The understanding is that juvenile delinquency is extremely rare ... (in deep rural areas) and when it occurs it is adequately dealt with within the simple village social-structure".19 However, the precedent for dealing with these problems on a scale which is novel to Ethiopian society is derived from the developed nations. Hence the reliance on established Western Welfare practice, and the importation of foreign experts to advise and assist; the system appears to be the donation of loans, and the supplying of personnel to ameliorate or solve the problems they have created. This is perhaps a reversal of the traditional pattern of colonialisation; trade following in the steps of the missionaries. We now have the "do-gooders" making water-tight the work of the traders. The accul-

turalisation process is merely perpetuated. Linked to this practice is the training of Ethiopians abroad. The funds from Britain alone to give technical training to Ethiopians have increased from £27,000 to £65,000 over the period 1969-73.20 The US have educated more than 1,500 Ethiopian men and women "so they might quickly take leadership positions in Ethiopia's Development Programmes."21 The results are best illustrated by a modern Somali tale. There were four Somali Civil Servants; ene educated in France, another in Russia, a third in Britain and the other in Somalia. During the course of their work, they came across an acacia tree who asked them individually what type of tree she was. Those trained abroad all confessed their ignorance, each in his adopted tongue. Only the one educated in Somalia knew the answer, whereupon the tree cried: "I have served this country all these years, and now even her sons don't recognise me". The tale speaks for itself.

Knowingly or not, Ethiopia's acceptance of the established modes of economic development through industrialisation has launched it upon a futile quest for "take-off". This Holy Grail can only be achieved by large capital investment or aid from the developed countries and their advice and assistance on how to utilise it. Ethiopia has been forced willy nilly down the slippery slope of economic growth. As little aid has been given for agriculture, despite the majority of the population being peasant farmers, Ethiopia's repayment has to take the form of concessions under terms little better than those offered to the African kingdoms of the 19th century. Although today there is no Rhodes, there are still the multinational industrial giants ruthlessly hunting for raw materials. There is a new vocabulary and sophistication and the victim is now expected to co-operate with the exploiter. In effect, there has been a superimposition of previously tested modes and techniques, with little consideration for culture, geography or historical perspective, and which are totally inappropriate to Ethiopia.

The recent upheavals in government have not as yet initiated any perceptible change in developmental policy. Thus far, these policies have in the long term benefited only a small minority of the population, implanted false hopes in

many others, and enmeshed the countryin a world system in which it is unlikely to profit. Despite the "philanthropy" of the Developed Nations with regard to the Third World, it must be realised that it is entirely within the interests of the former to exploit the latter. Given ecological and natural constraints there is no possibility of equalising the consumption of the poor countries to that of the level enjoyed in the rich, even if it were desirable. Rather than blindly accepting the ideas, technology and institutions diffused from the Developed World, in the future Ethiopia might well be advised to question these values, and look towards China, neighbouring Somaliland, and primarily its own cultural heritage, for a more positive and satisfactory approach. For on the past record one might well ask whether development is learning the over-skill of eating a banana with a knife and fork?



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Introduction to Ecology

MAN, NATURE AND ECOL-OGY Edited by Sir Julian Huxley. Aldus Books/Jupiter Books. £3.95

THE MITCHELL BEAZLEY ATLAS OF WORLD WILD-LIFE. Mitchell Beazley Ltd. £9.50

I find this an extremely difficult book to review and am left asking myself for whom it has been designed. The introduction by Sir Julian Huxley does not help. His overriding concern is survival and, therefore, with the question of world population control. He states unequivocally that man's increase rate must be reduced to zero *now* if we are to survive—but the book contributes no new thinking on the subject.

Man, Nature and Ecology opens with a series of diagrams illustrating the population explosion, increasing starvation, spreading pollution and dwindling resources. These are clear enough and would be useful aids for lectures at 5th and 6th form level.

Four authors then take up the tale Keith Reid commences with chapters on the physical and chemical backgrounds required for an understanding of ecology, and discusses some of the consequences of upsetting the balance of an ecosystem. He illustrates his statements with well known examplesovergrazing of land-over hunting of certain species-exploitation of resources-pesticides-pollution and so on. J. A. Lauwerys follows with four chapters outlining man's "progress" throughout his short history on earth from the beginnings when he played his proper rôle in the ecosystems of his

natural habitat, to his present lamentable condition; inevitably some of the same ground is covered as in the previous section-land use, soil erosion etc-and indeed one wonders how the begetters of this book outlined to their authors the area each was to cover. Here we have Mr Lauwreys writing a section entitled Man the Predator in which he discusses some of the wild life species which have been hunted to extinction or are currently threatened with extermination (bison, seals, whales etc) and three chapters later Joyce Joffe takes another look at the same problem in her chapter Wild Life Gives Way.

She follows with a chapter on what is being done to help endangered species in wild life parks etc, and comments on the plight of the African population in East African game parks, who, because they cannot possibly pay the high cost of a licence, are now regarded as poachers if they hunt in the land where their people have hunted from time immemorial.

Joyce Joffe's section on Population must clearly be aimed at a very young readership—".... Islam and Hinduism permit a man several wives—a type of marriage called Polygamy". The section is illustrated by chillingly frightful examples of posters used in birth control propaganda in the Third World.

Antony Tucker wrote the last chapters which prove to be the most valuable. He writes with authority, marshalls his facts clearly and pulls no punches. His contribution could stand on its own as an introduction to ecology and an answer for those who still ask "Must we believe the prophets of doom?". He deals with the long term implications of pollution, discusses the question "Can man feed himself?" with a realistic look at the sheer statistics of the problem, and ends with a chapter entitled Suicide or Solution. This is a run down on what has been said and written so far in the Club of Rome, the Stockholm Conference, The Forrester Model, The Limits to Growth and our own A Blueprint for Survival among others.

After this totally adult and profoundly thoughtful summing up we are catapulted back into an unbelievably naive world of classroom and woman's institute, in a hideously illustrated six pages purporting to tell us what we can do about it all. Once more I ask who on earth is this book for? Well produced, in parts very well illustrated, and modestly priced, it contains a few nuggets of gold, much restatement of material which has been covered in other books and some things which should never have been put in.

There is no doubt at all for whom the Atlas of World Wildlife has been produced. For all lovers of nature—animal and plant—whether young or old, well informed or just beginning to learn, this lavish atlas cum guide book, has much to recommend it. Sir Julian Huxley again contributes the foreword and the list of consultant and contributing zoologists is formidable.

The atlas is very well designed and the maps and diagrams are beautifully clear. It is irritating to have keys separated from the panoramic illustrations to which they refer but perhaps this was unavoidable. The line drawings are superlative throughout the book, and the colour photography is of the high standard one would expect in a production of this kind.

The book is divided into parts covering each region of the world, and contains also sections on evolution, ecology, the impact of man and industry; and three sections on endangered species (marvellously illustrated by Richard Orr). Throughout, the letter press is short and to the point, and the illustration is copious. I recommend this book as a splendid present for grandchildren and godchildren, and as a prize in any number of contexts.

Ruth Lumley-Smith.

#### The Passing of Rural England

THE DECLINE OF AN ENG-LISH VILLAGE by Robin Page. Davis-Poynter, £3. THE QUIET REVOLUTION: SOC-IAL CHANGE IN A SUSSEX VILLAGE 1871-1971 by Peter Ambrose. Chatto & Windus, £6.25.

Writers on the English countryside, someone once remarked, seem always to place its Golden Age in the period coinciding with their own childhood— Goldsmith idealised the 1730s, Cobbett the 1760s, Clare the 1790s, and so on. (The phenomenon does not *necessarily* prove that all these Golden Ages were imaginary; an alternative hypothesis

could be that for two centuries or more there has been a gradual, steady decline in the quality of rural life.) Whatever the explanation, the process continues: in The Decline of an English Village. the nostalgic gilding has reached the 1940s. At that time, writes Robin Page -born in 1943-"the scene was virtually as it had been for generations, apart from one or two mechanical innovations, with men working on the land, boys following in their fathers' footsteps, and women busying themselves with the home and family". Page's book is mostly devoted to lively reminiscences of his childhood: but inevitably it also traces the changes of the past thirty years in Barton, his native Cambridgeshire village. It is a familiar theme-the new residents on the dormitory estates, "like sophisticated gypsies" with no sense of belonging in the village; the destruction of hedges, spraying of wild flowers, straightening and "cleaning" of the brook. Like most villages, Barton now suffers from fast through traffic; but requests for a speed limit have been refused-the "accident-injury rate is not high enough!"

But it is the social change that country people seem to feel most in today's villages. This is the aspect studied in depth by Peter Ambrose in The Quiet Revolution, a sociological survey of Ringmer in Sussex. His conclusion is not far different from Page's. On population increase, for example, "the growth since the early 1960s has differed not just in degree but in kind". Dr Ambrose dubs it "superimposed" growth as opposed to the "organic" growth of all Ringmer's previous history. "It derives from fundamental changes that have taken place nationally... the impetus for the change is not generated within the parish." Throughout the book he places Ringmer in its national context, showing how transport education, the mass media, the economics of affluence have contributed to transform the village from a self-contained and largely selfsufficient community into what is now virtually a suburb, accidentally located in the midst of agricultural land. The change is not all bad: at least the majority of the villagers apparently like living in Ringmer, and have no intention of moving elsewhere. But the occupations, the hobbies, the values, the buildings are increasingly suburban. If cultural diversity is a good thing, the loss

here has been incalculable—a subtle, well-intentioned genocide has been committed. "Take what you want," says God in the proverb, "but pay for it": and no doubt the loss of the old organic, localised culture is the price we are paying for an end to the old poverty. But is it a *fair* price? How large a part should "standard of living" play in the more elusive concept of "quality of life"? Both these books implicitly ask that question: they cannot be blamed for not giving a conclusive answer in what is probably the great debate of our time.

Nicholas Gould

#### Natural Selection in Operation

THE EVOLUTION OF MELA-NISM. The study of a recurring necessity with special reference to industrial melanism in the Lepidoptera. Richard Kettlewell. Clarendon Press, Oxford. xxiv + 423 pp £10.25 (1973)

The short title of Dr. Kettlewell's book is perhaps a little misleading to the non-biologist, to one unacquainted with his now famous work. It is not a general account of blackness in nature, although this broader theme is occasionally touched on. Rather it is concerned with the author's own research work on the evolution of industrial melanism in moths; this is in fact made clear in the subtitles.

The main text is divided up into seven parts, added to which are three appendices, and other information, notably an extensive bibliography. In the latter, Kettlewell's name is by no means "recessive", but he takes continual care to acknowledge the help of collaborators and predecessors.

The initial fifty pages are little more than a routine introduction; in chapter 5 "The Phenomenon of Industrial Melanism", Kettlewell gets down to the essence of his work—primarily the studies on the moth *Biston betularia*. The *Biston* story has now become a classic to all students of biology, and, however modest the author may be in almost disclaiming his own role in its elucidation, we cannot help but see his clear enthusiasm, obvious patience and definite ingenuity shining through. The Biston story remains the most widely quoted, fascinating and studied case of adaptive evolution in action. For the pure biologist, it has brought a wealth of data on the predatory habits of birds. the genetic roots of melanism and thus the dynamic intricacies of natural selection in operation. For the more "environmentally minded" of us, it is important as an indicator of the Industrial Revolution; to the optimist in us, it is perhaps gratifying that some moths at least have been able to survive on pollution-blackened tree trunks. If only all animals, both big and small, had been as adaptable as this!

It is interesting to know that similar situations exist in other species, including butterflies, and that melanism occurs independently of industrial pollution; of such is indeed the natural reservoir of genetic variability that has enabled adaption by many species to an altered environment. But this independence has no doubt been the source of significant changes in moth faunas; some species have been able to respond to change rapidly, while other British species had to "wait" long periods of time for rare mutations, enabling spreading into industrially polluted areas only much later. In North America, on the other hand, nonindustrial melanic forms were apparreadily available; Kettlewell ently makes the interesting suggestion that this may be connected with the presence of fire-resistant trees throughout most of that region. Thus in the genus Graptolitha, the single British species still has not evolved a dark form, although all its relatives in North America have.

The final section, entitled "synthesis" is somewhat disappointing; one has the feeling that a true synthesis-a proper welding of the story of industrial melanism into modern evolutionary theory-has not been affected. Perhaps the word "synopsis" would have been more appropriate. The book is nonetheless a tribute to Kettlewell's devotion in tirelessly investigating one aspect of a central biological problem-the evolutionary process-and the industrial age, with the darkening of backgrounds and diminution of light intensity that ti has brought, especially to the British Midlands.



Sir,

I have read your journal since its inception: you have put forward some good ideas, some rather in advance of their time, others impossible to operate. That is probably the main failure of the conservationist/environmentalist movement, Friends of the Earth apart. For sheer impracticability Malcolm Slesser's "The Energy Ration" wins First Prize!

Of course I agree that we must conserve energy now (and a lot more in twenty years once oil and natural gas have peaked and we have experienced the first nuclear disaster), and invest in renewable non-polluting sources for the time when low-sulphur coal, shales and sands have been used up.

But the method Slesser proposesthe issue of energy coupons on an annual basis for every citizen young or old, for every service and for all goods, for producers, processors, distributors and consumers alike-could only mean a vast bureaucracy (and vast forests to provide the necessary paper), interminable wrangles about energy contents and priorities, and not the least, a hatred by the public of the whole concept of energy conservation, now at last becoming quite respectable due to rising energy prices. Money is quite bad enough, but his little chip with everything? To compare this with VAT is ludicrous, and that was bad enough, and only directly affects a comparatively small number of people in its administration. Innumerable practical objections come to my mind, and to every other reader in any way connected with business or bureaucracy. International trade, Common Market regulations? The scramble on the days before the expiry of the coupons? The choice for an OAP between feeding her cat or lighting a fire?

My solutions are much simpler. The government could:

(a) use its direct control over three of the four energy producers (with North Sea Oil soon coming under its direct control) and indirect control over farmers and foresters who use solar energy, to introduce sensible pricing and tariff policies;

(b) introduce fiscal measures for encouraging energy-saving measures such as better insulation standards, more public transport, district heating, the recycling of certain waste materials;

(c) penalise the wasteful use of nonrenewable energy, starting with the electricity generating boards, the over use of packaging materials, Concorde and so on;

(d) institute a crash programme into the utilisation of renewable and nonpolluting sources of energy.

But surely this article is just a parody, written by Wilfred Beckerman or John Maddox?

I I I I

Yours faithfully John Goodland, Down House, Pyleigh, Somerset.

Sir,

Mr Goodland, like myself, has probably suffered from your editorial blue pencil. Had my examples been published he would have seen the old age pensioner would be much better placed than he or she was—for he would enjoy an equal share of a scarce resource.

The point of difference between Mr Goodland and myself is that I believe in maintaining that basic quality of democracy— free choice. Mr Goodland's beauracratic paternalism is just the sort of thing we must struggle against these days; moreover his propositions lack the essential element of feed-back, by which society, and we its elements, have an incentive to treat energy not as a commons, but as a private or valued good, to be intelligently used.

Yours faithfully, *Malcolm Slesser*, Glasgow, Scotland.

Sir,

Edward Goldsmith strains reason to its limits when he suggests (The Ecology or War—May 1974 issue) that social systems derive from competition between individuals which leads to the

Nicholas Polunin (Jr)

establishment of hierarchies where cooperation is possible. Hierarchy is not "another word for organisation or order", but specifically means graded organisation, an error which continues into his example of the first multicellular organism (which was probably not a hierarchical structure at all, but composed of identical cells grouped in the form of a single chain or hollow sphere).

It is very hard to imagine the process by which he suggests "the first multicellular organism developed as a result of competition between its previously independent cells", as such competition would surely lead at most to a hierarchy of independent cells, and even that is unlikely.

The first multi-cellular organism must rather have developed by the failure of separation at successive cell divisions; as in fact they have been formed ever since.

Similarly, human societies are more likely to have originated from the staying together of parents and children beyond biological independence, in other words by extension of the family, although to compare "organism" with "organisation" may not be quite so simple.

Yours sincerely, Bernard Greenwood, Wolterton, Norwich.

Natural systems tend towards stability, ie: continuity. The information determining their control is organised hierarchically. That which reflects the experience of a long period giving rise to a more general response being hierarchically superior to that reflecting the experience of a short period which gives rise to a particular response—for example genetic information is hierarchically superior to cultural information.

Thus in a traditional society the elders who are the custodians of the traditional values must be hierarchically superior to members of younger age groups. If not the society must be unstable as is ours.

Editor

#### Sir,

Beth Porter contests some of K. Jannaway's statements, but some of her own are also open to question:

1. "People all over the world eat meat in every society and tribal collective." This is certainly not true. There are many groups which do not eat meat at all, either because of religious embargo or because it is not available; and many others, like the Vilcabambans of Ecuador, who eat very little (about 2 ozs. a week) and flourish well into their hundreds.

2. Is it absurd to talk about "traditionally vegetarian India" with its strong religious taboos on meat-eating?

3. Is it necessarily true that gorillas

"removed from their habitat and maintained on a purely vegetarian diet sicken and often die" because of their diet, which supports them satisfactorily in the wild? It would seem more likely that they succumb to the stress of captivity and change, and that this affects their digestive systems. The statement "the micro-organisms cannot survive the move" would appear to confirm this.

On the matter of man's inhumanity to man, is this likely to increase or diminish if he curbs his inhumanity to other species? As Beth Porter relevantly asks "Where do we draw the line?" It is a good deal narrower between different species of the animal kingdom—e.g. between man and cow—and between man and micro-organism, and presumably it must be drawn somewhere?

There is inevitably much cruelty involved in the rearing and slaughtering of animals for meat, and our youngsters who sit cheerfully slitting chickens' throats to pop music at the rate of several thousand an hour, are hardly likely to develop sensitivity to their fellow-humans. If universally accepted Veganism might well solve the World Food Problem: unfortunately man in general is addicted to meat—what he has to ask is whether its price (not merely what is paid over the counter) is worth paying.

Joanne Bower, 4 Willifield Way, London, N.W. 11.

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BOOKS REVIEWED or advertised in Ecologist, and any other books on environmental and related subjects, can be supplied by CONSERVATION BOOKS—The Conservation Society Book Service. Efficient, reliable service-orders from stock sent by return of post. Please state title, author and publisher, and send full payment including 10% for P & P. For our latest classified stock list, please send an SAE to: Conservation Books (E), 28 Bearwood Road, Wokingham, Berks., RG11 4TD. Tel: 0734 780989.

AUDIO-VISUAL AIDS IN ENVIRONMENTAL EDUCATION The audio-visual feature will now appear in October, not September as first indicated. This is as a result of making August/ September a combined issue.

THE ECOLOGIST is the best recruitment medium for graduates in environmental sciences.

# **Classified advertisements**

#### HOLIDAYS

#### **EXMOOR NATIONAL PARK**

Unique holiday in 77 acre woodland nature reserve containing red deer. Nature trails, hides, wildlife garden, organic produce. Only 6 camouflaged caravans, modern toilet facilities. SAE Brochure. Cowley Wood Conservation Centre, Parracombe, North Devon, Parracombe 200. 10% discount F.O.E.

**COUNTRY LOVERS' RETREAT.** Haven of peace amid wooded Welsh hills. Abundant wildlife in beautiful unspoilt surroundings. Brochure S.A.E. Starlings Castle, Bronygarth, Nr. Oswestry. Tel 0691 72 464

#### PERSONAL

FAMILY OF FOUR with sufficient freelance income to live, are looking for a 5 acre smallholding around 50 miles west of London. The aim is to improve the quality of life by a more harmonious existence growing food and raising some livestock. We realise that our aim towards a limited self-sufficiency would be greatly improved if we were linked with a similar family pursuing a similar aim. We don't envisage a commune but two independent units which could collaborate in producing a sufficient variety of food. If you are seriously interested and have the means available to make such a move, we would like to hear from you. Box No. PD45.

**GIRL**—18-25, intelligent, imaginative, rational, social conscience, physically fit, sought by young man of similar attributes who fears inevitable eco-catastrophe and desires companionship of attractive like-minded partner with whom to share happily the remaining years of industrial civilisation. No children desired of course. Perfectly serious. All letters answered. Box No. PD.27.

**OPPORTUNITY** to join young couple with smallholding worked in spare time. Initially for trial period with view to partnership. Box No. PD 48

#### **PROPERTY WANTED**

WANTED—approximately 5 acres of good horticultural/farm land with living accommodation within 50 mile radius of London for family contemplating self-sufficiency. Condition of living accommodation immaterial provided it can be made habitable, but soil must be good we don't mind undergrowth, weeds and nettles but object to soil which has been drenched with chemicals for a decade. Adequate funds available for sensible offer. Box No. PD46.

#### PROPERTY FOR SALE

**COTSWOLDS.** Small stone terrace house in unspoilt village, 5 bedrooms, 2 wcs, nice beams, excellent water-heater (and primitive copper). Scope for improvements; no urgent repairs. Large shed, fruit trees. Garden not overlooked. Telephone, Bus, Railway  $3\frac{1}{2}$  m. £16,500. Meanwhile available holiday lets. Box No. PD 49.

**EXOTIC SETTING,** unspoilable valley, sea, Exmoor wildlife; period 12 bedroomed easilyrun house, woodland garden. £39,500. Photographs: Lynton 2285. Box No. PD43.

#### HOME CRAFTS

SPIN AND WEAVE? I make handcarders (for traditional craftsmen and others), Hedgehog drum carders (for groups, schools, the dedicated and lazy rich) and Canadian Indian Spinners (for spinning thick or thin yarns) with a low price tag. K. T. Willcocks, Wheatcroft, Itchingfield, Horsham, Sussex.

**IN ORDER TO COMPILE A DIRECTORY** of individuals, communes, groups who are involved with Home Crafts, we need your participation. Why not advertise what you have for sale in the next issue. Suggestions for new headings in the Classified section are always welcome.

THE ECOLOGIST HAS THE LARGEST SELF-SUFFICIENCY READERSHIP OF ANY PUBLICATION IN BRITAIN. CONTACT THEM THROUGH THESE PAGES.

#### LIVESTOCK FOR SALE

FOR SALE. British Saanen Kids and two Milkers. Good healthy stock from organic holding. Fisher, Cheswardine, Shropshire. Tel. Cheswardine 336.

THE READER RESPONSE to classified advertisements in *Ecologist* shows the classified page to be a highly effective advertisement medium.



The October issue of the Ecologist will feature Bees—their vital role as pollinators as well as that of honey producers.

There will also be a report on Beekeeping for Self-sufficiency.

If you have bees, beekeeping equipment, beekeeping books or beekeeping 'knowhow' for sale, why not advertise in this issue.

#### **Classified** rates

Display: £4 per single column inch Lineage: All classifications 8p per word-Minimum £3

Box numbers: 25p per insertion

Series discount: 5 insertions 5%; 10 insertions 10%

Classified advertisements must be prepaid (cheques made out to INTERPRESS) and sent to Katie Thear, *Ecologist* Advertisement Department, 19 Anne Boleyn's Walk, Cheam, Surrey. (Tel: 01-642 5826).

PLEASE SEND REPLIES TO BOX NUMBERS TO THE ADVERTISEMENT DEPARTMENT, NOT TO CORNWALL.

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| Signed Address |   |
| Date           |   |

# Ecologist Conference on Ecology and Religion

What is Religion? What role does it play in determining a society's total behaviour pattern?

Are the notions of man's uniqueness, and of his dominion over the rest of nature—which are common to the principal revealed religions—compatible with the maintenance of a society's stable relationship with its environment? If not what must be the features of a religion which does ensure such stability?

Are there societies which have been characterised by such features? If so what can we learn from them?

This is the theme of the two-day conference organised by The ECOLOGIST to be held at Conway Hall, Red Lion Square, London W.C.1 on Thursday and Friday 28th and 29th November 1974.

Chairmen: Father Adrian Hastings. Peter Cadogan, General Secretary of South Place Ethical Society. Speakers: Robert Waller, Author and associate editor of the Ecologist. Antoine Stanislaus, Sinhalese Anthropologist. Robert Allen, Author and Ecologist. Satish Kumar, Editor of Resurgence. Jimoh Omo Fadaka, Associate editor of The Ecologist. Edward Goldsmith, Publisher and Editor of The Ecologist.

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FEE: £5.00. Students £2.50.

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**REGISTRATION FORMClosing Date for Registration: 22nd November.**TO: The "ECOLOGIST", 73 Molesworth Street, Wadebridge, Cornwall, PL27 7DS (Tel. 020 881 2996/7).

| I wish to reserveplace(s) at £for the Conference "Ecology and Religion".           |
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| I enclose £  |
| Name Dr/Mr/Mrs/Miss/Rev  |
| Address:   |
| If student, state University, Polytechnic, College, School                         |
| Cheques, Postal Orders etc. should be made payable to the "ECOLOGIST" and crossed. |
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