

Ecologist

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The God that Died • Our Obsolete Market Mentality

Sailing Barges of the Future



Nicholas Gould writes about

**William
Morris**

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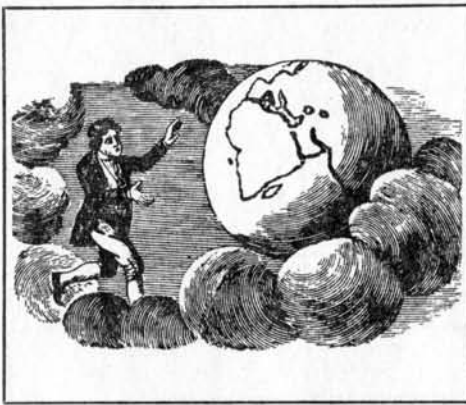
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Comments

How to avoid Flixboroughs

What caused the Flixborough disaster? The experts tell us it was a burst pipe, but do they know? In fact it doesn't really matter. It is only of use to know what precise technical fault was the immediate cause of the explosion if it were possible to prevent not only the failure in question but technical faults in general from recurring. But this is impossible.

All processes can and do go wrong; even subtle biological ones are subject to error. Those taking place in genetic processes give rise to mutants. Those occurring during the development of the embryo in the womb can lead to deformed or dead fetuses. During cell division they result in tumours which can become cancerous and cause death. During the socialisation process, in which a child learns to become a differentiated member of its family and society, errors give rise to deviants and delinquents.

Mutations, deformed and dead fetuses, tumours and social deviants have in common that they are random rather than differentiated parts. They also have in common that they are inevitable. One cannot prevent them, only create the conditions in which both their incidence and their effect are reduced to a minimum. This is, in fact, admirably achieved by genetic and cultural evolution, whose goal, as is that of all self-regulating behavioural processes, is stability (which is nothing more than the reduction to the minimum of the incidence and effect of discontinuities including, of course, random errors).

If errors occur in such processes, into which there has gone several thousand million years of research and development, how much more likely are they to occur in our ridiculously rudimentary technological processes which are based on relatively untried principles.

In addition, as industrialisation proceeds, the greater is the impact of technological processes on biological, ecological and social ones.

These become increasingly unstable, that is to say they become subject to increasing discontinuities.

It is no accident, for instance, that the mutation rate is rising, as is the incidence of cancer and social deviance. Crime, alcoholism, drug addiction and mental diseases are increasing at an ever greater rate—as is industrial conflict, sabotage and violence between different social groups. As our economy becomes dependent on the proper functioning of increasingly dangerous and increasingly large scale technological installations, so are these trends ever less tolerable. (It is intolerable, for instance, that the crew of a U.S. Nuclear Submarine should be largely made up of drug addicts—as was recently found to be the case.)

Accidents to technological installations, it must follow, can be predicted on the basis that they must occur, not only as a result of technological faults which themselves are inevitable, but also of biological, social and ecological ones, whose incidence, as industrialisation proceeds, can only increase.

This brings us to reconsider the notion of "cause". Scientists today attempt to understand the world by examining its processes in isolation from each other in terms of single one-way "cause" and "effect" relationships. It can't be done.

It is possible that the Flixborough factory might not have exploded if a pipe hadn't burst, but neither would it if it had never been built, nor if there had not been an industrial revolution, nor if the British Isles had never been inhabited, nor if Homo Rapiens had never evolved beyond the stage of Pithecanthropus Erectus.

Each of these events can be regarded as a "cause" in the sense in which we use the term. The specific event which we single out as the "cause" is simply the one which appears relevant in the context of the corrective policies we

have decided in advance to apply to prevent the recurrence of the incident, the "cause", in fact, we are willing to do something about.

Clearly Homo Rapiens has evolved and is in fact around in ever increasing numbers. No-one is likely at the moment at least to suggest his extermination. Clearly too he has discovered the British Isles and is unlikely to vacate them. Also the industrial revolution has occurred and we shall probably continue building factories like that at Flixborough until it becomes impossible to do so. The burst pipe, therefore, must be *the* "cause", because it is the only one we can do something about, short of reversing the course of progress, vacating these islands or exterminating Homo Rapiens.

Unfortunately, we are applying the wrong criterion in selecting the relevant "cause" of the accident. *The important one is not that which we think we can do something about, but the one which must be countered to make absolutely sure the accident will not recur.*

Even if we design indestructible pipes for our chemical works, this will not prevent future accidents. The only way to do so, and by the same token to prevent life on this planet from being annihilated by inevitable, increasingly numerous and increasingly lethal accidents to such things as nuclear power stations and nuclear waste retreatment plants, is not to build them. (The U.S. Atomic Energy Commission has publicly admitted that by the end of the century we can expect at least one Nuclear accident every year.)

There is one thing wrong with this argument. In the same way that one can predict accidents in technological installations, so one can predict that, in an industrial society, there will be an irresistible tendency to build such installations since the economy must grow, and a stage is eventually reached when it can only grow by constructing them.

To be consistent, therefore, the important and hence relevant "cause" is not, in fact, the building of the plant, but the creation of a situation in which it can be predicted that the plant will be built, i.e. the development of an industrial society.

The only way to prevent Flixboroughs, it must follow, is to de-industrialise society, and that is precisely what we must start doing right away.



I mean, hasn't it ever struck you that the decline in your population
may have something to do with your initiation rites?



THE GOD THAT DIED

CREDO MUTWA is an extraordinarily wise Zulu shaman who displays great perspicacity, as well as feeling, in appraising the true plight of the Zulus under a white regime. This is best understood in terms of the destruction of their culture and way of life, rather than in terms of material exploitation which it is customary to accentuate.

Time and time again, the Bantu religion has been called a heathen faith. But who is nearer to God—the man who lives in a big city and thinks only of earning more and more money, or the man who lives close to the earth that God created, albeit in poverty and ignorance?

To the Bantu, politics are no more than a single and humble part of their religion, and an expression of it; to the white man, it often seems, the reverse is true; the religion exists to further and justify his lust for worldly power. Nowhere is this more manifest than in the "Christianising" of the Xhosa in British Kaffraria. The object of the whole exercise was to break the power of the witchdoctors, and reduce the Xhosa to a race of servile employees.

The white men needed black labour, especially in the mines, as had all the alien invaders of the past. After conquering us, they imposed a tax which they insisted we pay in money. They

would not accept eggs, chickens, or cattle, as had all our own chiefs in the past. They wanted *coins*, with Queen Victoria's head on them. We had no money, and therefore we had to go and work for the white men in order to pay our taxes. No Bantu would ever have gone to live and work in the white man's cities for any other reason. Until as late as the nineteen-thirties, there was still slavery in this country, to all practical purposes. The Bantu worked, on the farms and in other places, without pay. His employer provided him with food, accommodation, and discarded clothing, and at the end of the year paid his taxes for him, and this was all the Bantu gained from the transaction. Sometimes Bantu who had been working for many years for the same employer would receive one extra privilege: they would be given, at the end of each month, a keg of cheap wine. The servants who enjoyed this privilege would live for the end of the month, when they would get good and drunk,

and as happy as lice in a Fingo's blanket. These fools believed that it was this liquor which made white men white, and if they could drink enough of it they would become white too.

Though there were many as foolish as this, most of the Bantu were bitter and resentful, and the power of the tribal witchdoctors was very strong. The white man feared this influence, and was anxious to convert as many Bantu to Christianity as possible.

According to Bantu beliefs, a race or tribe is as good as the gods it believes in. When the white men won battle after battle against us, we became anxious to learn all about their god, who was clearly more powerful than ours, and to shelter under his protection. It is also a Bantu tradi-

This extract from *My People* by Credo Mutwa by kind permission of Anthony Blond Ltd.

tion that if a man becomes the blood-brother of another tribe, and adopts the tribe's customs, beliefs and language, he will never be molested by any member of that tribe, or subjected to any indignities.

The Bantu also thought that the white men despised them because of their barbaric beliefs and customs, and hoped that if they adopted the white man's religion this attitude would change. The white man's education was eagerly sought for the same reason. In those early days Bantu parents who could afford it sent their children to schools and colleges in England. And yet, after all the sacrifices involved in doing this, they discovered that they were still no better treated than their "heathen", uneducated compatriots. A kaffir is a kaffir, learned, Christian, or not.

"Send O Lord More Missionaries"

But before this discovery was made, there were many willing converts. One of our early Christian hymns has a line which says: "Send, O Lord, more missionaries..." This prayer, unfortunately, was granted. Many of these were cold, self-seeking, even brutal men. They came in abundance, and worse, they came in many different wrappings. In the long, silent, ferocious battles between the different denominations to win as much territory as possible in Africa, there were many missionaries who were not above using naked intimidation to get the Bantu into their particular church.

I know of one German missionary in the North-Western Transvaal, who threatened to call the government troops in to mow down those Bantu who were absent from his church on Sunday. We have witnessed Catholics and Protestants, Anglicans and Dutch Reformed Churchmen flying at one another's throats with the viciousness of drunken tsotsies. We have seen single families split up as fathers, mothers and children are recruited into different sects and taught to regard one another as heretics. And this is the religion that teaches that we are all one in Christ!

I am not, of course, denying that many missionaries are good, honest, dedicated men, who have done much for my people. But while it takes scores and scores of sweating men to build a church, it needs but one madman with a mattock to knock it down again, and

this has happened all over Southern Africa.

Buried in an Unknown Pauper's Grave

But there are other ways in which the Bantu have been blackmailed into accepting Christianity, not by individual missionaries, but by the changes in our way of life itself. To a Bantu anywhere in Africa, to be buried in an unknown, pauper's grave is the deepest disgrace that can befall him. Within his own tribal community a man can always be sure of a respectful burial, but those who are forced to leave their tribal environment for the white man's towns and farms have no access to any cemetery but the Christian ones, and then only if they have accepted the Christian faith. Dead Bantu of other than Christian faith are delivered over to the municipal authorities for burial in unmarked graves or dissection in medical schools. For this reason alone, hundreds and hundreds of Bantu have had to become Christian.

Dead Bantu of other than Christian faith are delivered over to the municipal authorities for burial in unmarked graves or dissection in medical schools. For this reason alone, hundreds and hundreds of Bantu have had to become Christian.

On the 21st March, 1963, my baby son Mandelkosi died in my arms of gastroenteritis while I ran with him the two miles to the hospital. I had to turn round and head back for home while his little body turned cold in my arms. I made the coffin myself and prepared him for burial. My wife and two of my sisters, who attend the Catholic church regularly, went to the priest and asked him to bury the child. He refused. He refused because although the rest of my family are all members of his church, I am not.

I dedicate this article to my little baby, Mandelkosi.

Because of the reasons I have given, many, many Bantu have turned Christian, but Christianity can never make them happy. Christianity does not suit the Bantu at all. The conflict between the different denominations, which puzzles the Bantu terribly, is only one aspect of Christianity which the white man may understand and accept, but the Bantu cannot. The white man tradi-

tionally feels free to interpret his religion in his own way—he changes it to suit his changing times—but the Bantu religion admits of no change whatever, of no interpretation at all—only blind acceptance. These conflicting denominations make us doubt the validity of the religion itself.

What is right for one race is not necessarily right for another. We, for instance, are frightened by the noises made by violins—those funny little chin-guitars of the Europeans. The "music" played by white men on these terrible monstrosities is, to my Bantu ears, absolutely maddening. But white men seem to understand this weird scraping and screeching that sounds as if a thousand witches were being tortured. What is more, they seem to understand the meaning of the noises produced, a thing I do not, and never will. This is not because I am an untutored savage; it is simply proof of what I am trying to convey, that what is clearly understandable to one race is often not appreciated by another.

On the other hand, many white people cannot, and never will, properly understand and appreciate Bantu tribal singing; to their ears it simply amounts to so much raw shouting, clapping and mad stamping.

The white man likes to worship God in a way that is alien to the soul of the Bantu. The Bantu prefers to rejoice, to sing, to clap hands and dance before his gods and goddesses. Hymns composed by white men sound dirge-like to Bantu ears; they are too dull and solemn. When one sings these hymns one does not feel that one is honouring God, but rather that one is lamenting the death of one's own

soul. Prayers read from a prayer-book can sound dull and insipid, without meaning or spirit, completely insincere, as stereotyped as government forms in triplicate. The rites in the Catholic and Anglican Churches in Africa are too standardised, too rigid. One does not feel free to glorify God according to the wishes of one's own heart.

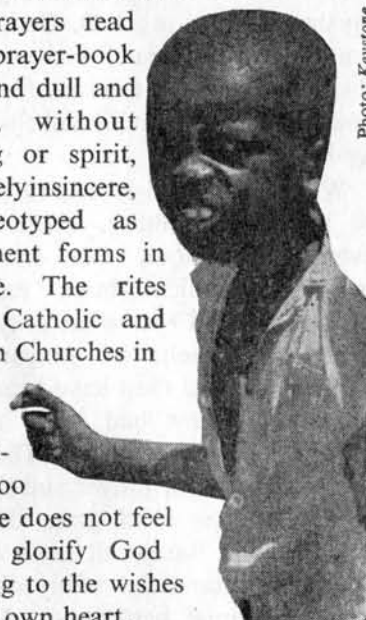


Photo: Keystone

When a black man turns to God, he wants to talk to God, not to repeat standard recitations. He wants to unburden his troubled heart and soul before the Almighty. He wants to bring his own problems, as well as his personal fortune, to the attention of God. He is not interested in reading something in Latin, or even English or Dutch. He wants to sing and praise God in his own tribal dialect. The black man is a born poet and some of the hymns the Bantu have composed, both in words and tune, are far more suitable than those imported from Europe. When a black man prays, he wants to gesticulate and pray at the top of his voice; he wants to weep before God, or laugh aloud if the occasion is one of happiness. This nature of the Bantu has enabled him to survive pressures that have driven scores of nations to rebellion and war.

When the Bantu feel that their prayers have been granted, they want to show their gratitude to God. They want to come dancing before God, clapping hands and booming drums, leaping, twisting and turning—no solemn clasping of hands and closing of eyes, with a barely audible and completely emotionless “I thank thee, Father, for all thy goodness...”

A typical Bantu prayer would be more like the following: “O Great God. O High Chief of the skies and the earth, of all that I can see and cannot see, Father of all that I know and do not know, I prayed to You, and You have heard my prayer. The white man granted me a rise in wages, O Great God of all my ancestors. He raised my wages to five pounds a week—see, here it is, here I have got it in my hands, look at it! O, God, see the gratitude in my heart! I can now pay the Superintendent the rent I owe him, and when I pay him, I shall thank You again, dear Lord.”

White people might regard this kind of prayer as childish, irreverent and even blasphemous. But from what prayer-book did Moses recite on Mount Sinai? From what prayer-book did Joshua recite his prayer before Jericho? Would God have heard those prayers if they had been repeated parrot-like from a book? The Bantu prefer freedom of prayer and they seek those churches which grant them this.

But to the Bantu, all these different churches ultimately offer only one thing: spiritual bankruptcy. I believe

Christianity to be one of the worst plagues ever to strike this land. What does Christianity offer us? It severs us from our own ageless roots, and it gives us nothing in return. Fortunately, in the case of most Christian Bantu, the veneer of Christianity is very thin; to a large extent, the future of Africa still rests in the hands of the witchdoctors. But to many others it has brought only dissatisfaction with tribal life, and a desire to be accepted by the white men as one of themselves—something that will never happen. It has brought prostitution, illegitimate children by the thousand, and venereal disease, because it preaches against polygamy even while men are separated for long periods from their wives by the white men's laws. But the worst thing of all that it has brought is doubt, even atheism.

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Those who accepted Christianity did so, in the majority of cases, simply to become accepted in their turn by white men. This failed to happen, but in the process these Bantu lost touch with their own native faith. They saw white men practise anything but what they preached, and they were told by some that God made us out of dust, in his own image, while others told them that we are all descended from the monkeys. And now we see the white man turn his own back altogether on the religion he taught us so fervently. Vast numbers of white men not only forsake God and deny his existence, but even write to the newspapers, encouraging others to do the same, and heap ridicule on those who continue to believe in Him.

Many Bantu believe now that the white men set out deliberately to mislead us, that they not only taught us a creed in which they do not themselves believe, but they indulged in all these inter-denominational disputes with the sole object of keeping the Bantu divided into numbers of harmless factions. The

Bantu are beginning to hate Christianity—they associate it, more than anything, with the political deceptions that have been played on them. In any riot, it is the mission schools which are always the first to be burnt down.

But what is to be put in its place? Many, many of these Bantu are empty, bleak, Godless zombies, ripe for conversion to any subversive creed. Man without God in his heart is lost! Christianity is turning us into a race of atheists—we who were the deepest possible believers for thousands and thousands of years. And still the missionaries are coming...

Apartheid

On the 28 March 1964, I was sent by my employer to book some theatre tickets for her. When I reached the theatre there was already a small queue. With this kind of establishment there are no separate queues for whites and Bantus. It is, however, quite normal for employers to send their Bantu employees out on such missions and, failing separate facilities, black and white people fall in the same queue, with no ill feelings whatsoever. But this particular morning I happened to be the only Bantu in the queue. Not wishing to offend anybody, I first approached the commissionaire at the door and asked his advice. He indicated that I would be welcome to join the single queue. This I reluctantly did and then, by all the gods, the trouble started!

A black-haired young man, accompanied by his woman who had a fantastic hair style, pushed me aside with his elbow and took my place in the queue. This beautiful example was followed by a young girl of about 13 or 14, who gave me one of the most contemptuous stares I have ever received. There was a chain reaction. They pushed me out of the queue one by one, in twos and threes, old men, fat women. Then a real bull of a man with close-cropped hair seized me by the back of my collar and literally hurled me out of the queue, with enough force to send me hurtling down the synthetic marble steps of the palatial building.

I was not offended; nobody with the childhood I have had would have been offended. Nobody who grew up on a farm where he was sjambokked at least twice a week as a matter of principle, even by the farmer's youngest son,



Photo: Keystone

I was not offended; nobody with the childhood I have had would have been offended.

would have been offended. No person who, like me, had spent three nightmare weeks in a prison for a paltry pass offence, would have been offended. I was only troubled—because the queue was getting longer and longer and the lady in the shop wanted the tickets. The show was a particularly popular one.

I appealed to the commissionaire again and he told me to stay in the queue.

He helped me to get a place approximately where I had been before, behind the man who pushed me out. Objections were then raised by those behind me, and one man angrily wanted to know “what in hell” this “native” was doing there. The commissionaire tried to explain that I was buying tickets for my “missus”. “Well, let him wait on one side until we have finished,” said a rather overweight yellow-haired woman, in a sleeveless dress covered with red flowers. I had no choice but to leave the queue, and it was already half-past ten.

Then a voice sounded clear above the general rumble of complaints. A man of about fifty with whitening temples and in the open neck khaki attire typical of the farmer, complete with a tired-looking hat with a band of animal-skin around it, shouted out loud: “Hell, let the fellow get in... what’s the matter with you?”

I got in, but I was too late—only the most expensive seats were left and they were beyond the price I had been in-

structed to pay. As I left, I passed close by the man who had spoken out for me. He was very obviously a farmer, powerfully built and puffing away at a pipe long overdue for retirement...

I salute you, O white man, although I shall never know who your ancestors were and to what tribe you belong. I salute you, O white man, not only because you spoke on my behalf, but because you are a man with a conscience, and in our country men of your kind are very, very rare. White people who shoulder us aside are all too common, and we have plenty of hypocrites in South Africa too—men who talk loudly about equal rights in public, but in private do nothing whatever to make life easier even for their own Bantu servants. In the days when I was struggling to get this book published in South Africa, I wrote to a number of “progressives” and “liberals” in this country, merely asking them to advise me as to the best approach. Of all these protagonists of racial equality only one had the courtesy to reply. But even he was not prepared to extend a helping hand in my direction.

Yes, we have many men like these in our country, but so few, O unknown white man in the theatre queue, so few like you!

What the world fails to realise is that apartheid is what the Bantu want, from the Transkei up to Nigeria and Ghana. Apartheid is what we want and what we need—what we do not want is discrimination.

Apartheid is a word which the world outside South Africa has come to know and hate, but how many people know what it really means? The world has equated this word with discrimination, but in fact it means almost the opposite. To discriminate is to distinguish between two things and decide which of them is best. Apartheid is to distinguish *without* deciding which is best. Apartheid is a law of nature. We do not see different species of birds and animals mingling together indiscriminately, but each remaining with its own kind, its own customs and instincts. Nor do we see them arguing that one species is superior to another. This argument seldom arises among human beings unless two different

racess, nations or creeds become mingled together in the same place. Are the Afrikaaners to be blamed for having made this discovery?

What the world fails to realise is that apartheid is what the Bantu want, from the Transkei up to Nigeria and Ghana. Apartheid is what we want and what we need—what we do not want is discrimination.

I have no wish to be turned into a black white man, or a white black man, not for all the money in the Reserve Bank. I do not wish to live the kind of life the white man leads—a life of tension, fear, and ceaseless worry, of competition and rivalry, a life of selfish ambition and of “doing unto others before they do unto you”. I do not want to strip myself of all human feelings, moral standards, of conscience itself, to sell body and soul to the spirit of money. I do not want ulcers or coronary thrombosis. Nor do I want my children to be soulless halfbreeds dressed in jeans, rocking and rolling to the Beatles morning, noon and night, and calling me “Daddy-O”.

All I ask of life is to be granted the opportunity to live again in a typical Zulu kraal, at peace with the world, with a Bantu wife to bear me stalwart Bantu sons and daughters to whom I can teach the tribal law and in whom I can instil respect and reverence for our tribal heritage, and no squads of policemen raiding me in the small hours of the night to check where I was born and whether I have a permit to be where I am.

The only Bantu who do not want this are those poor creatures who are already so detribalised that they no longer know how or what they are or what is good for them. For these, apartheid comes much, much too late.

Respect for Malan and Verwoerd

It will surprise many people outside South Africa to hear that General Smuts, great statesman though he was, was not particularly well liked by the Bantu, while Dr. Malan and Dr. Verwoerd, and the other leaders of their government, have had the Bantu’s respect. This is because General Smuts was never straight with us—he never had a clear-cut policy which we could understand, he never gave us anything to hope and live for—while the present government, for all its faults, is at least doing something definite to help us.

Many Bantu do not believe this. They view anything the white men do with bitter suspicion, and believe that they are being moved to the reserves so that the whites can exterminate them more easily, without hurting other races in the process. This silly idea is encouraged by the way in which ignorant people all over the world have blackened the present government worse than the bottom of a witch's pot. No good will come of this belief, or of encouraging it.

In Rhodesia, and in many other parts of Africa, inter-racial goodwill has been preached, but the opposite practised. In Rhodesia a white woman may take her dog into a shop with her, but she must leave her Bantu employee on the pavement. When I was in Rhodesia in 1958 I was not permitted to enter many of the shops. I had to hand my money to a white-coated, red-fezzed waiter at the door, who did my purchasing for me. Thus Bantu customers must take what they are given—no opportunity to select, no opportunity to complain about quality. In South Africa, at least, there is less of this type of hypocrisy.

This is not to say that the present government is without its faults, and I am not afraid to say so. I have no reason to be grateful to this or any other previous South African government. The white man's civilisation has ruined our country beyond repair—our customs and culture have been torn to shreds, and many of our people are lost past all hope. And I, were it not for the white man's government and religion, would have been born an induna, a counsellor to the Zulu king, and instead I am a bastard and a beggar dog.

The present government are allowing discrimination and apartheid to go together, and this must stop. There must be a change of heart on the part of the white man. The ideals of separate development must not be tainted by petty cruelty and hatred, but must be accompanied by goodwill and mutual respect. Apartheid will never work without this, and without it there cannot be other than more bloodshed—bloodshed worse than we have seen yet.

The Bantustans are being created within South Africa now, and it is from the Bantu youth of today that the future rulers of these statelets will emerge. History has shown us time and time again that a colony soon grows



Credo Mutwa—Extraordinarily wise shaman

to become stronger than the parent state which created it, and white South Africa is going to be surrounded by these Bantu states. I have already spoken about the Bantu's capacity for revenge. Do the white men in South Africa today really believe that it won't happen?

The white man's civilisation has ruined our country beyond repair—our customs and culture have been torn to shreds, and many of our people are lost past all hope.

Yet even now it is not too late. If discrimination is ended now, there is every chance that the Bantu will forgive. But the white man has been the aggressor in all things in Africa—the onus is on him to make the change. It will be very difficult, but it must be done.

In the setting up of the Bantustans, other serious mistakes are being made. Why, for instance, are big townships being built in our reserves, with European-style houses? Nothing is more foreign to the Bantu inclination than this. Why are they not building the kind of dwelling-houses used in the rest camps of the Kruger Game Reserve? These would have been far more attractive, far less costly, as well as much more suitable for our traditional way of life.

As for the big townships themselves, they have done nothing in the past but spiritual and bodily harm to our people. It is these townships which are responsible for the decline in health and morals among the Bantu. The Bantu are not suited to life in these vast communities—they live best and feel most secure in small, compact villages where everyone knows everyone else and where neighbours can gather under a tree to settle their differences peacefully. Why aren't villages of this kind being

built in the reserves? Large townships are also difficult to police, and are at present shoddily administered, as shown by the fact that sometimes telephones do not work.

Fear, Illness and Crime

Nothing is more terrible than to run to a phone booth half a mile away to call the police or ambulance as a stabbed person lies bleeding, only to find that the telephone does not work. Policemen serving in large townships soon become indifferent, with the result that crime flourishes and murderers get away with violence time and again. How many of the scores of weekend murders committed in the townships around Johannesburg are ever solved? Whole families have been butchered while onlookers watched helplessly... and the police have come long, long after the killers have got away, never to be caught. This would not happen in a small village that police can quickly surround. People live in fear in the great townships; they live in fear of their lives day and night. I live in Diepkloof, about two miles away from a very big police-station, and yet I have seen terrible fights taking place and men dying with the killers melting away, leaving bodies stiffening in the grass... and no policeman comes for hours. I once saw an old man's body, murdered and dumped not far from my house and in plain sight of many people, lying from well before dawn till

past midday before the police came to cover the mutilated thing and take it away.

Township life offers the Bantu no security; only fear. It offers them no life; only death by illness or at the knives of murderers. It offers the growing Bantu child no stability and the aged no comfort... and these things are essential for all human family life, whether on the plains of Africa or anywhere else in the world.

Another mistake is the idea of giving the Bantustans complete independence in the near future. Only chaos could result from this, as has been seen in other parts of Africa. The abuse of power would be terrible, and bribery and corruption the order of the day. I am well aware of the faults of my race, and one of the very worst of our characteristics is our proneness to bribery. We do not have the white man's feelings that bribery is something to be frowned on—to us it is a sport, part and parcel of our culture. The man who pays the highest *lobolo* price gets the best wife; the most senior induna is the one who has made the largest present of cattle or daughters to the chief. Thus, when an African is trained for a position of trust, it is not enough to teach him how to do the job—it is also essential to impress on him that the job is sacred and that he must take a pride in it and not use it merely to feather his own nest and hurt other people. I do not say that all Bantu

officials are dishonest, but many are, and until this practice of giving and taking bribes has been stopped, the greediest and most dishonest men are bound to infiltrate the key positions.

Nor will democracy as we have been taught it ever work in Africa. The whole concept of loyalty to two dissenting factions is utterly incomprehensible to the black man, who has been accustomed for thousands of years to rulership by a single chief and his indunas. The attempt to make the Bantu accept a European style of government is yet another example of an alien creed disrupting the stability of our own traditional way of life without giving any benefit. It would be far better for us to return to our former system of government.

But already I fear it is too late. The selfishness of the rich Bantu, who never give anything even to Bantu charities, Bantu hospitals, old people's homes or children's feeding schemes, is a by-word throughout South Africa. And meanwhile the peasant has been taught by the white man to cease regarding his rulers as sacred, and to resent this unfair distribution of wealth.

We can never go back now to life as it was before the white man came. And when one looks into the future, one sees only doubt and discontent, bloodshed, bloodshed and more bloodshed. Oh my Africa, what will become of you?

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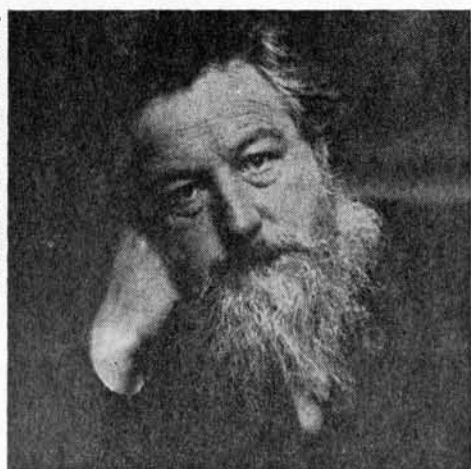
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William Morris

by Nicholas Gould

"William Morris (1834-1896), poet, artist, manufacturer and socialist". So the Dictionary of National Biography introduces him: and even that brief description, with its improbable assortment of vocations, suggests that we have here to do with a rather remarkable man. A fuller account can only increase the reader's astonishment.

William Morris the pioneer of modern design, the best selling poet, the creator of wallpapers and fabrics which are enjoying a revival in the 1970s, revered by the Labour Party as one of their father-figures and by the Tolkien-cult as author of romances which anticipated *The Lord of the Rings*, founder of the Society for the Protection of Ancient Buildings, reviver of the art of fine printing, populariser of the Icelandic sagas for English readers, master of a score of traditional crafts—there are so many Morrisises that it is hard at times to believe that they are the same man. Yet it was agreed by those who knew him that there was an extraordinary wholeness about Morris: he was a full human being, perhaps the only one of his time. But he himself was touchingly convinced of his own ordinariness—it was the rest of the world that was out of step. The political struggles which dominated his later years were an attempt to create for all men an environment in which

they could realise their potential, as he had done: and while we may disagree over details, nothing less than Morris's concern for the *total* human environment should satisfy us today.

The key word in any discussion of Morris's ideas is Art, no human activity was more important to him than this. Yet it is in some ways an unfortunate word to use. Artists nowadays tend to be professionals, specialists, and to produce objects which are not useful, but merely beautiful (and often, to the untrained eye, not even that!) *Crafts*, a word which perhaps comes closer to what Morris meant by Art, has fallen into some disfavour since his time, and implies to many people mere hobbies for the production of showy clutter. Neither word does Morris justice. Though he certainly had talent enough to have made a reputation as a painter, he seems to have regarded painting as too solitary, élitist an occupation: painting was a luxury but art in his sense was a necessity. The production of articles for everyday use, which should combine beauty with utility, was for him the true work of the artist: and an artist in this sense should not be a self-conscious superior professional, but an ordinary man. Again and again he points out that this state of affairs, far from being an impossible dream, was the normal human condition in societies which the 19th century Englishman would have despised as backward and barbarous. Were not the museums full of everyday household articles of past ages, now preserved as valuable masterpieces? "All the heaped-up knowledge of modern science, all the energy of modern commerce, all the depth and spirituality of modern thought, cannot reproduce so much as the handiwork of an ignorant superstitious Berkshire peasant of the 14th century: nay, of a wandering Kurdish shepherd or of a skin-and-bone oppressed Indian villager".

If art was as natural a human activity as Morris maintained, there must be something radically wrong with a society in which it had virtually ceased to exist. There was nothing selfish about his revolt against that society; for in his own way of life he was largely immune to the defects of 19th century civilisation. His days were spent in the practice of a succession of crafts—painting, weaving, writing,

He was infuriated by the hypocrisy of rich capitalists who professed an interest in art while refusing to do anything to prevent industrial pollution; what right had they to shut themselves up with beautiful objects, while depriving other people of the natural beauties of the earth? and how could they care for a picture of a landscape when their behaviour proved that they did not care for the real landscape?

dyeing, printing, embroidery and a dozen more—which kept his skilled hands and active brain busy and contented (and incidentally, made him a rich man). But he could not help comparing his own fulfilment with the drab misery of other men's lives. His reaction had begun as an aesthetic one, but eventually became a moral and political one as well. "My ordinary work forced on me the contrast between times past and the present day, and made me look with grief and pain on things which many men notice but little, if at all... I found that the causes of the vulgarities of civilisation lay deeper than I had thought, and little by little I was driven to the conclusion that all these uglinesses are but the outward expression of the innate moral baseness into which we are forced by our present form of society, and that it is futile to attempt to deal with them from the outside".

All his life Morris was painfully conscious of the *abnormality* of industrial civilisation. He felt himself to be an outsider, the clear-sighted man in the country of the blind; "dreamer of dreams, born out of my true time", as he describes himself in one poem. So his criticisms of his own century tend to be based in another period with less topsy-turvy values—either the Middle Ages or an ideal socialist future. It is not surprising that his voice was one of the first to be raised against the environmental effects of industrialisation. As an artist and a lover of nature, he was sickened by the fact that "this great treasure of mankind, the earth, which was beautiful before man lived on it, which for many ages grew in beauty as man grew in numbers and power, is now growing uglier day by day, and there the swiftest where civilisation is

the mightiest". Thus industry, or "competitive commerce", the phrase Morris prefers, has forced most of the population to crowd together into great cities, "amidst ugliness and squalor so revolting and disgusting that we could not bear it unless habit had made us used to it; that is to say, unless we were far advanced on the road towards losing some of the highest and happiest qualities which have been given to men". That last note is one Morris often sounds: Be careful that you don't let modern life so dull your sensibilities that you begin to accept it as normal; refuse to adapt, if adaptation means losing some of the attributes of humanity.

Morris did not accept the argument, common then and not unknown today, that pollution inevitably accompanies industry, and that the cost of preventing it would be prohibitive. "We must turn this land from the grimy back-yard of a workshop into a garden. If that seems difficult, or rather impossible, to some of you. I cannot help it; I only know that it is necessary. As to its being impossible, I do not believe it. The men of this generation have accomplished matters that but a very little while ago would have been thought impossible. They conquered their difficulties because their faces were set in that direction, and what was done once can be done again. Why, even the money and the science that we expend in devices for killing and maiming our enemies present and future would make a good nest-egg towards the promotion of decency of life, if we could make up our minds to that tremendous sacrifice". He was infuriated by the hypocrisy of rich capitalists who professed an interest in art while refusing to do anything to prevent industrial pollution; what right had they to shut themselves up with beautiful objects, while depriving other people of the natural beauties of the earth? and how could they care for a picture of a landscape when their behaviour proved that they did not care for the real landscape? (I am reminded of the recent sale of a Stubbs painting of a cheetah for a sum of money sufficient to have ensured the survival of cheetahs as a *species*.)

As for the wealth which industry was alleged to confer on society, it all depended, said Morris, on what you meant by wealth. In the first place, a high proportion of the increased manu-

facture was for purposes which any rational man would agree were strictly useless: "sordid makeshifts for the supply of poor folk who cannot afford the real article; luxuries for rich folk, the greater part of which even their personal folly does not make them want; and the wealth wasted by the salesmanship of competitive commerce." Moreover, we often sacrificed the wealth of the natural world for our artificial prosperity. "What have you done with Lancashire?" he asked in a lecture at Manchester. "Were not the brown moors and the meadows, the clear streams and the sunny skies, wealth?" The rape of the English countryside has advanced so far since Morris's day that it comes as a surprise to find how often he echoes our own complaints: when, for instance, he speaks with feeling, and obviously from personal experience, of "revisiting some spot of country which has been specially sympathetic to us in times past", only to find that the village we remember has swollen to an ugly suburb.

"What have you done with Lancashire?" he asked in a lecture at Manchester. "Were not the brown moors and the meadows, the clear streams and the sunny skies, wealth?"

Morris did not want a natural world, totally free from human influence: he was not a man for wilderness. He loved England, a land without "great wastes overwhelming in their dreariness, great solitudes of forests, terrible untrodden mountain-walls". His ideal was a comfortable symbiosis between man and nature. "Out in the country", he says, "we may still see the works of our fathers yet alive amidst the very nature they were wrought into, and of which they are so completely a part; for there indeed if anywhere... was there a full sympathy between the works of man and the land they were made for". His Utopian romance, *News from Nowhere*, is set in the South of England, an agrarian but populous England. One is seldom out of sight of a house, but the houses are well dispersed amid cultivated land, and are moreover so beautiful that they enhance the landscape rather than spoil it. (Among other improvements, the Houses of Parliament have become a storehouse for manure.) *News from*

... the evil effects of the industrial system were spreading like a disease to the rest of the world. "No country is safe from its ravages, the traditions of a thousand years fall before it in a month..."

Nowhere was written as a reaction to Edward Bellamy's *Looking Backward*, a science-fiction Utopia depicting the society of the future as centralised, bureaucratic, and predominantly urban, how far Morris's very different ideal was intended to present a serious blueprint for the future is a matter for dispute, but certainly his book is almost unique in its genre as portraying an ideal society in which it would actually be extremely pleasant to live. *News from Nowhere* depicts an essentially mediaeval Utopia. Morris loved the Middle Ages (though he was not as blind to their horrors as is sometimes alleged), and naturally incorporated their best features in his future society. Consequently, the occasional vague references to "immensely improved machinery" come as something of a shock: but Morris was never in favour of abolishing industrial technology as a whole. Indeed, he sometimes pokes gentle fun at "cultivated people, people of the artistic turn of mind" to whom "machinery is particularly distasteful". He was always insistent that the fault lay less with the machines themselves than with the way in which they were used. In the first place, "machines can do everything, except make works of art" Morris was abnormally sensitive to the artificial look of machine-made goods. His comments bear repeating, and thinking about: factory products have "a certain high finish, and what I should call shop-counter look, quite peculiar to the wares of this century; but it is of necessity utterly unintelligent, and has no sign of humanity on it... Whatever art or resemblance of art is on it has been doled out with due commercial care, and applied by a machine, human or otherwise, with exactly the same amount of interest in the doing it as went to the non-artistic parts of the work".

But a purely aesthetic argument was not enough for Morris: he saw behind the dull perfection of factory wares the misery or boredom of the factory worker. Art was for him "the expression by man of his pleasure in

labour": it followed that where there was no art, work could not be a pleasure. The only use for which machines were justified was "to release people from the more mechanical and repulsive part of necessary labour". The time so saved could be used for increased leisure (which, to Morris, meant primarily *creative work* of some kind). As things were, however, "no worker works an hour the less on account of these labour-saving machines, so-called". And the evil effects of the industrial system were spreading like a disease to the rest of the world. "No country is safe from its ravages, the traditions of a thousand years fall before it in a month: ... the Indian or Javanese craftsman may no longer ply his craft leisurely, working a few hours a day, in producing a maze of strange beauty on a piece of cloth: a steam-engine is set a-going in Manchester, and that victory over Nature and a thousand stubborn difficulties is used for the base work of producing a sort of plaster of china-clay and shoddy, and the Asiatic worker, if he is not starved to death outright, as plentifully happens, is driven himself into a factory to lower the wages of his Manchester brother worker, and nothing of character is left him except, most like, an accumulation of fear and hatred of that to him most unaccountable evil, his English master. The South Sea Islander must leave his canoe-carving, his sweet rest, and his graceful dances, and become the slave of a slave; trousers, shoddy, rum, missionary and fatal disease—he must swallow all this civilisation in the lump".

The effects of industrialism on the consumer at home were hardly better. The general public was totally ignorant of the methods and processes of manufacture. "Almost all goods are made apart from the life of those who use them": and so people inevitably lived artificial, alienated lives. Moreover, the tendency of civilisation was towards even greater complexity; we were be-

coming too dependent on systems and organisations beyond the control of the individual: and we had "multiplied our needs" to a point where the attempt to satisfy them made social justice and a beautiful world impossible to achieve. Morris was under no illusions that the way back to sanity would be an easy one. He thought it possible that European civilisation might collapse under its own weight: the end might be long in coming, "but when it does, it will be far more terrible, far more confused and full of suffering, than the period of the fall of Rome". Into the maw of the Age of Commerce "honour, justice, beauty, pleasure, hope, all must be cast ... to stave off the end awhile: and yet at last the end must come". The fulfilment of that prophecy seems to have come appreciably nearer in the last year or so.

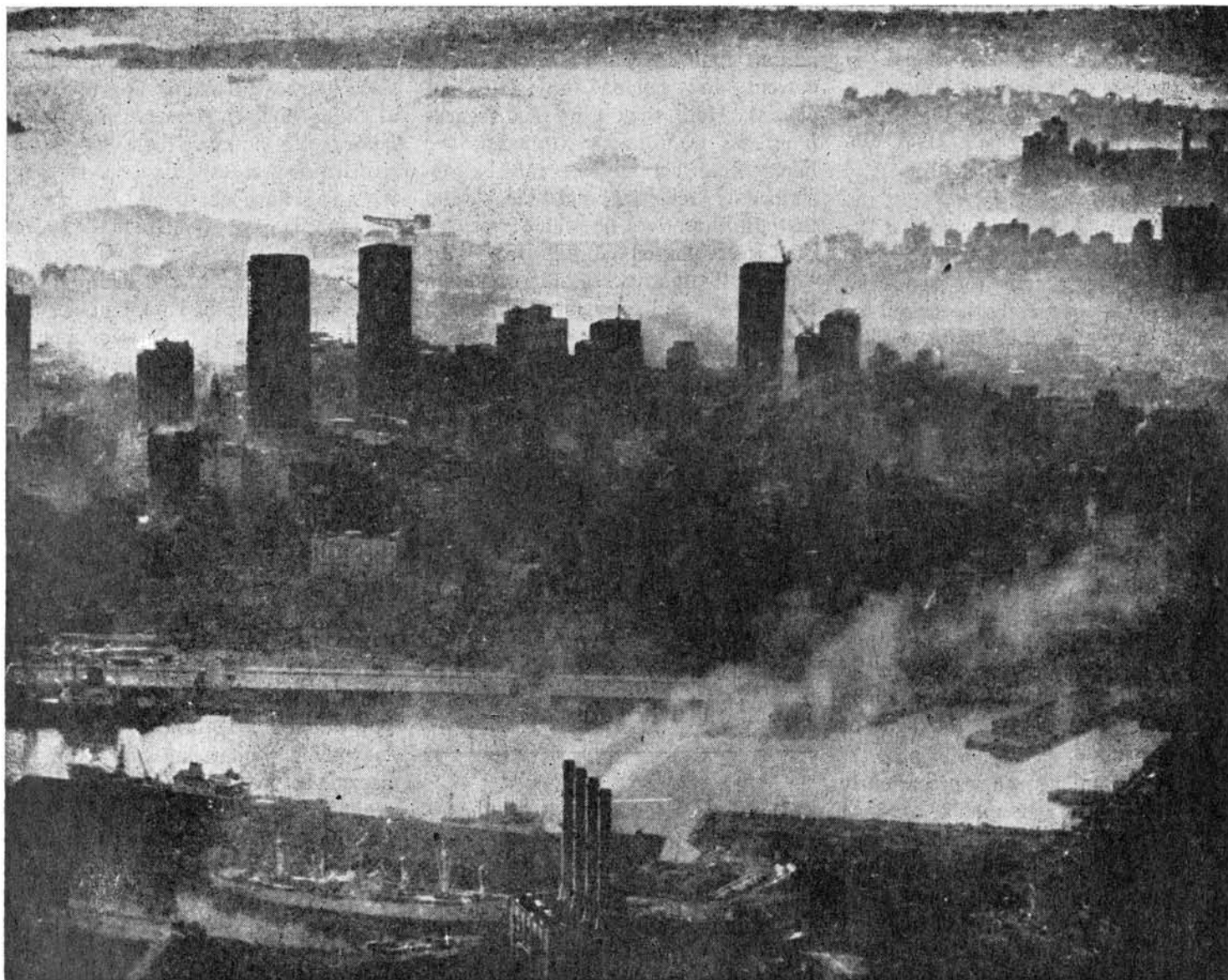
Morris was under no illusions that the way back to sanity would be an easy one. He thought it possible that European civilisation might collapse under its own weight: the end might be long in coming, "but when it does, it will be far more terrible, far more confused and full of suffering, than the period of the fall of Rome".

If this collapse were averted, and industrialism survived, the prospect for mankind seemed hardly happier—a welfare-state paternalism with the bland artificiality of a Brave New World, "a Whig committee dealing out champagne to the rich and margarine to the poor in such convenient proportions as would make all men contented together, though the pleasure of the

eyes was gone from the world, and the place of Homer was to be taken by Huxley". (Thomas Henry, not Aldous!) The only way of escaping both these ends, the bang *and* the whimper, lay in revolution; not necessarily violent, but certainly involving a total change in society, and a new direction for civilisation. Even before the new order was achieved throughout the world, however, we should do our best to practise it in our own lives. Simplicity was the keynote. Our material possessions should be few but of the best quality: "Have nothing in your house that you do not know to be useful or believe to be beautiful". Reduce your needs to the point where you can satisfy them all yourself; take a genuine interest in all the details of daily life; "Take trouble, and turn your trouble into pleasure". After the revolution, of course, these principles would be applied more widely; work which was unavoidably unpleasant, such as coalmining, must be done by machines or, failing that, by everybody taking turns, or perhaps, better still, we should learn to do without the end product altogether.

I have quoted extensively from Morris's essays and lectures, because they explain his philosophy of life better than I could do. But I am conscious of the inadequacy of my result; for the essential fact about Morris was the way in which he *lived* his beliefs. The divorce between theory and practice, between the world as we would like it to be and the necessity to survive in the world as it is, presents us all with a problem. The higher our ideals, the greater the dilemma. Morris seems to offer us a way out. His example proves that it is possible to be happy in an imperfect world, without compromising one's ideals or losing one's normal vision. His message is needed today as much as it ever was, for its values are timeless ones—integrity and the joy of creation, the love of nature and of man, courage and hope.





Someone living in a modern conurbation can only feed himself by selling his labour.

OUR OBSOLETE MARKET MENTALITY

by Karl Polanyi

Modern economics are based on the experience of the industrial era — an extremely small sample of the total human experience. During this period there was no empirical reason for doubting that the world was infinite, either in its capacity to provide us with resources or to absorb industrial wastes. Today this is no longer true. Resource depletion and pollution have introduced costs which modern economics are at a loss to take into account.

Similarly this discipline is simply not designed to explain the economic behaviour of pre-industrial traditional societies. This important fact was probably best demonstrated by Karl Polanyi, an economic historian of undoubted genius who we must count among the foremost precursors of what might be termed the *ecological* way of thinking.

In this remarkable article written some years ago he shows how modern economics are based on the totally unjustified assumption of the universality of the market economy.

The first century of the Machine Age is drawing to a close amid fear and trepidation. Its fabulous material success was due to the willing, indeed the enthusiastic, subordination of man to the needs of the machine. Liberal capitalism was in effect man's initial response to the challenge of the Industrial Revolution. In order to allow

scope to the use of elaborate, powerful machinery, we transformed human economy into a self-adjusting system of markets, and cast our thoughts and values in the mould of this unique innovation.

Today, we begin to doubt the truth of some of these thoughts and the validity of some of these values. Out-

side the United States, liberal capitalism can hardly be said to exist any more. How to organise human life in a machine society is a question that confronts us anew. Behind the fading fabric of competitive capitalism there looms the portent of an industrial civilisation, with its paralysing division of labour, standardisation of life,

supremacy of mechanism over organism, and organisation over spontaneity. Science itself is haunted by insanity. This is the abiding concern.

No mere reversion to the ideals of a past century can show us the way. We must brave the future, though this may involve us in an attempt to shift the place of industry in society so that the extraneous fact of the machine can be absorbed. The search for industrial democracy is not merely the search for a solution to the problems of capitalism, as most people imagine. It is a search for an answer to industry itself. Here lies the concrete problem of our civilisation. Such a new dispensation requires an inner freedom for which we are but ill equipped. We find ourselves stultified by the legacy of a market-economy which bequeathed us oversimplified views of the function and role of the economic system in society. If the crisis is to be overcome, we must recapture a more realistic vision of the human world and shape our common purpose in the light of that recognition.

Industrialism is a precariously grafted scion upon man's age-long existence. The outcome of the experiment is still hanging in the balance. But man is not a simple being and can die in more than one way. The question of individual freedom, so passionately raised in our generation, is only one aspect of this anxious problem. In truth, it forms part of a much wider and deeper need—the need for a new response to the total challenge of the machine.

Our condition can be described in these terms: industrial civilisation may yet undo man. But since the venture of a progressively artificial environment cannot, will not, and indeed, should not, be voluntarily discarded, the task of adapting life *in such a surrounding* to the requirements of human existence must be resolved if man is to continue on earth. No one can foretell whether such an adjustment is possible, or whether man must perish in the attempt. Hence the dark undertone of concern.

Market society

Meanwhile, the first phase of the Machine Age has run its course. It involved an organisation of society that derived its name from its central institution, the market. This system is on the downgrade. Yet our practical

philosophy was overwhelmingly shaped by this spectacular episode. Novel notions about man and society became current and gained the status of axioms. Here they are: As regards *man*, we were made to accept the heresy that his motives can be described as "material" and "ideal", and that the incentives on which everyday life is organised spring from the "material" motives. Both utilitarian liberalism and popular Marxism favoured such views. As regards *society*, the kindred doctrine was propounded that its institutions were "determined" by the economic system. This opinion was even more popular with Marxists than with liberals.

The crucial step was this: labour and land were made into commodities, that is, they were treated as if produced for sale . . . no more thoroughly effective fiction was ever devised.

Under a market-economy both assertions were, of course, true. *But only under such an economy.* In regard to the past, such a view was no more than an anachronism. In regard to the future, it was a mere prejudice. Yet under the influence of current schools of thought, reinforced by the authority of science and religion, politics and business, these strictly time-bound phenomena came to be regarded as timeless, as transcending the age of the market. To overcome such doctrines, which constrict our minds and souls and greatly enhance the difficulty of the life-saving adjustment, may require no less than a reform of our consciousness.

The birth of *laissez faire* administered a shock to civilised man's views of himself, from the effects of which he never quite recovered. Only very gradually are we realising what happened to us as recently as a century ago.

Liberal economy, this primary reaction of man to the machine, was a violent break with the conditions that preceded it. A chain-reaction was started—what before was merely isolated markets was transmuted into a self-regulating *system* of markets. And with the new economy, a new society sprang into being. The crucial step was this: labour and land were made into

commodities, that is, they were treated *as if* produced for sale. Of course, they were not actually commodities, since they were either not produced at all (as land) or, if so, not for sale (as labour). Yet no more thoroughly effective fiction was ever devised. By buying and selling labour and land freely, the mechanism of the market was made to apply to them. There was now supply of labour, and demand for it; there was supply of land, and demand for it. Accordingly, there was a market price for the use of labour power, called wages, and a market price for the use of land, called rent. Labour and land were provided with markets of their own, similar to the commodities proper that were produced with their help. The true scope of such a step can be gauged if we remember that labour is only another name for man, and land for nature. The commodity fiction handed over the fate of man and nature to the play of an automaton running in its own grooves and governed by its own laws.

Nothing similar had ever been witnessed before. Under the mercantile regime, though it deliberately pressed for the creation of markets, the converse principle still operated. Labour and land were not entrusted to the market; they formed part of the organic structure of society. Where land was marketable, only the determination of price was, as a rule, left to the parties; where labour was subject to contract, wages themselves were usually assessed by public authority. Land stood under the custom of manor, monastery, and township, under common-law limitations concerning rights of real property; labour was regulated by laws against beggary and vagrancy, statutes of labourers and artificers, poor laws, guild and municipal ordinances. In effect, all societies known to anthropologists and historians restricted markets to commodities in the proper sense of the term.

Incentives of hunger or gain

Market-economy thus created a new type of society. The economic or productive system was here entrusted to a self-acting device. An institutional mechanism controlled human beings in their everyday activities as well as the resources of nature. This instrument of material welfare was under the sole control of the incentives of hunger and

gain—or, more precisely, fear of going without the necessities of life, and expectation of profit. So long as no propertyless person could satisfy his craving for food without first selling his labour in the market, and so long as no propertied person was prevented from buying in the cheapest market and selling in the dearest, the blind mill would turn out ever-increasing amounts of commodities for the benefit of the human race. Fear of starvation with the worker, lure of profit with the employer, would keep the vast establishment running.

Economic motives

In this way an “economic sphere” came into existence that was sharply delimited from other institutions in society. Since no human aggregation can survive without a functioning productive apparatus, its embodiment in a distinct and separate sphere had the effect of making the “rest” of society dependent upon that sphere. This autonomous zone, again, was regulated by a mechanism that controlled its functioning. As a result, the market mechanism became determinative for the life of the body social. No wonder that the emergent human aggregation was an “economic” society to a degree previously never even approximated. “Economic motives” reigned supreme in a world of their own, and the individual was made to act on them under pain of being trodden under foot by the juggernaut market. Such a forced conversion to a utilitarian outlook fatefully warped Western man’s understanding of himself.

This new world of “economic motives” was based on a fallacy. Intrinsically, hunger and gain are no more “economic” than love or hate, pride or prejudice. No human motive is *per se* economic. There is no such thing as a *sui generis* economic experience in the sense in which man may have a religious, aesthetic, or sexual experience. These later give rise to motives that broadly aim at evoking similar experiences. In regard to material production these terms lack self-evident meaning.

The economic factor, which underlies all social life, no more gives rise to definite incentives than the equally universal law of gravitation. Assuredly, if we do not eat, we must perish, as

much as if we were crushed under the weight of a falling rock. But the pangs of hunger are not automatically translated into an incentive to produce. Production is not an individual, but a collective affair. If an individual is hungry, there is nothing definite for him to do. Made desperate, he might rob or steal, but such an action can hardly be called productive. With man, the political animal, everything is given not by nature, but by social circumstances. What made the nineteenth century think of hunger and gain as “economic” was simply the organisation of production under a market economy.

This new world of “economic motives” was based on a fallacy. Intrinsically, hunger and gain are no more “economic” than love or hate, pride or prejudice. No human motive is *per se* economic. There is no such thing as a *sui generis* economic experience in the sense in which man may have a religious, aesthetic or sexual experience.

Hunger and gain are here linked with production through the need of “earning an income”. For under such a system, man, if he is to keep alive, is compelled to buy goods on the market with the help of an income derived from selling other goods on the market. The name of these incomes—wages, rent, interest—varies according to what is offered for sale: use of labour power, of land, or of money; the income called profit—the remuneration of the entrepreneur—derives from the sale of goods that fetch a higher price than the goods that go into the producing of them. Thus all incomes derive from sales, and all sales—directly or indirectly—contribute to production. The latter is, in effect, *incidental to the earning of an income*. So long as an individual is “earning an income”, he is, automatically, contributing to production. Obviously, the system works only so long as individuals have a reason to indulge in the activity of “earning an income”. The motives of hunger and gain—separately and conjointly—provide them with such a reason. These two motives are thus geared to production and, accordingly, are termed “economic”. The

semblance is compelling that hunger and gain are *the* incentives on which any economic system must rest. This assumption is baseless. Ranging over human societies, we find hunger and gain not appealed to as incentives to production, and where so appealed to, they are fused with other powerful motives.

Man as a social being

Aristotle was right: man is not an economic, but a social being. He does not aim at safeguarding his individual interest in the acquisition of material possessions, but rather at ensuring social good will, social status, social assets. He values possessions primarily as a means to that end. His incentives are of that “mixed” character which we associate with the endeavour to gain social approval—productive efforts are no more than incidental to this. *Man’s economy is, as a rule, submerged in his social relations*. The change from this to a society which was, on the contrary, submerged in the economic system was an entirely novel development.

The evidence of facts, I feel, should at this point be adduced. *First*, there are the discoveries of primitive economics. Two names are outstanding: Bronislaw Malinowski and Richard Thurnwald. They and some other research workers revolutionised our conceptions in this field and, by so doing, founded a new discipline. The myth of the individualistic savage had been exploded long ago. Neither the crude egotism, nor the apocryphal propensity to barter, truck, and exchange, nor even the tendency to cater to one’s self was in evidence. But equally discredited was the legend of the communistic psychology of the savage, his supposed lack of appreciation for his own personal interests. (Roughly, it appeared that man was very much the same all through the ages. Taking his institutions not in isolation, but in their interrelation, he was mostly found to be behaving in a manner broadly comprehensible to us.) What appeared as “communism” was the fact that the productive or economic system was usually arranged in such a fashion as not to threaten any individual with starvation. His place at the campfire, his share in the common resources, was secure to him, whatever part he happened to have played in hunt,



Subsistence agriculturalists did not need to sell because they did not need to buy

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pasture, tillage, or gardening. Here are a few instances: Under the *kraalland* system of the Kaffirs, "destitution is impossible; whosoever needs assistance receives it unquestioningly" (L. P. Mair, *An African People in the Twentieth Century*, 1934). No Kwakiutl "ever ran the least risk of going hungry" (E. M. Loeb, *The Distribution and Function of Money in Early Society*, 1936). "There is no starvation in societies living on the subsistence margin" (M. J. Herskovits, *The Economic Life of Primitive Peoples*, 1940). In effect, the individual is not in danger of starving unless the community as a whole is in a like predicament. It is this absence of the menace of individual destitution that makes primitive society, in a sense, more humane than nineteenth-century society, and at the same time less "economic".

The same applies to the stimulus of individual gain. Again, a few quotations: "The characteristic feature of primitive economics is the absence of any desire to make profits from production and exchange" (R. Thurnwald, *Economics in Primitive Communities*, 1932). "Gain, which is often the stimulus for work in more civilised communities, never acts as an impulse to work under the original native conditions" (B. Malinowski, *Argonauts of the Western Pacific*, 1922). If so-called economic motives were natural to man, we would have to judge all

early and primitive societies as thoroughly unnatural.

Man's economy is, as a rule, submerged in his social relations. The change from this to a society which was, on the contrary, submerged in the economic system was an entirely novel development.

Secondly, there is no difference between primitive and civilised society in this regard. Whether we turn to ancient city-state, despotic empire, feudalism, thirteenth-century urban life, sixteenth-century mercantile regime, or eighteenth-century regulationism—invariably the economic system is found to be merged in the social. Incentives spring from a large variety of sources, such as custom and tradition, public duty and private commitment, religious observance and political allegiance, judicial obligation and administrative regulation as established by prince, municipality, or guild. Rank and status, compulsion of law and threat of punishment, public praise and private reputation, insure that the individual contributes his share to production. Fear of privation or love of profit need not be altogether absent. Markets occur in all kinds of societies, and the figure of the merchant is familiar to many types of civilisation.

But isolated markets do not link up into an economy. The motive of gain was specific to merchants, as was valour to the knight, piety to the priest, and pride to the craftsman. The notion of making the motive of gain universal never entered the heads of our ancestors. At no time prior to the second quarter of the nineteenth century were markets more than a subordinate feature in society.

Thirdly, there was the startling abruptness of the change. Predominance of markets emerged not as a matter of degree, but of kind. Markets through which otherwise self-sufficient households get rid of their surplus neither direct production nor provide the producer with his income. This is only the case in a market-economy where *all* incomes derive from sales, and commodities are obtainable exclusively by purchase. A free market for labour was born in England only about a century ago. The ill-famed Poor Law Reform (1834) abolished the rough-and-ready provisions made for the paupers by patriarchal governments. The poorhouse was transformed from a refuge of the destitute into an abode of shame and mental torture to which even hunger and misery were preferable. Starvation or work was the alternative left to the poor. Thus was a competitive national market for labour created. Within a decade, the Bank Act (1844) established the prin-



Their life was unaffected by the vagaries of the market.

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ciple of the gold standard; the making of money was removed from the hands of the government regardless of the effect upon the level of employment. Simultaneously, reform of land laws mobilised the land, and repeal of the Corn Laws (1846) created a world pool of grain, thereby making the unprotected Continental peasant-farmer subject to the whims of the market. Thus were established the three tenets of economic liberalism, the principle on which market economy was organised: that labour should find its price on the market; that money should be supplied by a self-adjusting mechanism; that commodities should be free to flow from country to country irrespective of the consequences—in brief, a labour market, the gold standard, and free trade. A self-inflamatory process was induced, as a result of which the formerly harmless market pattern expanded into a sociological enormity.

These facts roughly outline the genealogy of an “economic” society. Under such conditions the human world must appear as determined by “economic” motives. It is easy to see why. Single out whatever motive you please, and organise production in such a manner as to make that motive the individual’s incentive to produce, and you will have induced a picture of man as altogether absorbed by that particular motive. Let that motive be religious, political, or aesthetic; let it be pride,

prejudice, love, or envy; and man will appear as essentially religious, political, aesthetic, proud, prejudiced, engrossed in love or envy. Other motives, in contrast, will appear distant and shadowy since they cannot be relied upon to operate in the vital business of production. The particular motive selected will represent “real” man.

Markets occur in all kinds of societies, and the figure of the merchant is familiar to many types of civilisation. But isolated markets do not link up into an economy.

As a matter of fact, human beings will labour for a large variety of reasons as long as things are arranged accordingly. Monks traded for religious reasons, and monasteries became the largest trading establishments in Europe. The Kula trade of the Trobriand Islanders, one of the most intricate barter arrangements known to man, is mainly an aesthetic pursuit. Feudal economy was run on customary lines. With the Kwakiutl, the chief aim of industry seems to be to satisfy a point of honour. Under mercantile despotism, industry was often planned so as to serve power and glory. Accordingly, we tend to think of monks or villeins, Western Melanesians, the Kwakiutl, or seventeenth-

century statesmen, as ruled by religion, aesthetics, custom, honour, or politics, respectively.

Under capitalism, every individual has to earn an income. If he is a worker, he has to sell his labour at current prices; if he is an owner, he has to make as high a profit as he can, for his standing with his fellows will depend upon the level of his income. Hunger and gain—even if vicariously—make them plough and sow, spin and weave, mine coal, and pilot planes. Consequently, members of such a society will think of themselves as governed by these twin motives. In actual fact, man was never as selfish as the theory demanded. Though the market mechanism brought his dependence upon material goods to the fore, “economic” motives never formed with him the sole incentive to work. In vain was he exhorted by economists and utilitarian moralists alike to discount in business all other motives than “material” ones. On closer investigation, he was still found to be acting on remarkably “mixed” motives, not excluding those of duty towards himself and others—and maybe, secretly, even enjoying work for its own sake.

However, we are not here concerned with actual, but with assumed motives, not with the psychology, but with the ideology of business. *Not on the former, but on the latter, are views of*

man's nature based. For once society expects a definite behaviour on the part of its members, and prevailing institutions become roughly capable of enforcing that behaviour, opinions on human nature will tend to mirror the ideal whether it resembles actuality or not. Accordingly, hunger and gain were defined as economic motives, and man was supposed to be acting on them in everyday life, while his other motives appeared more ethereal and removed from humdrum existence. Honour and pride, civic obligation and moral duty, even self-respect and common decency, were now deemed irrelevant to production, and were significantly summed up in the word "ideal". Hence man was believed to consist of two components, one more akin to hunger and gain, the other to honour and power. The one was "material", the other "ideal"; the one "economic", the other "non-economic"; the one "rational", the other "non-rational". The Utilitarians went so far as to identify the two sets of terms, thus endowing the economic side of man's character with the aura of rationality. He who would have refused to imagine that he was acting for gain alone was thus considered not only immoral, but also mad.

Economic determinism

The market mechanism, moreover, created the delusion of economic determinism as a general law for all human society. Under a market-economy, of course, this law holds good. Indeed, the working of the economic system here not only "influences" the rest of society, but determines it—as in a triangle the sides not merely influence, but determine, the angles. Take the stratification of classes. Supply and demand in the labour market were identical with the classes of workers and employers, respectively. The social classes of capitalists, landowners, tenants, brokers, merchants, professionals, and so on, were delimited by the respective markets for land, money, and capital and their uses, or for various services. The income of these social classes was fixed by the market, their rank and position by their income. This was a complete reversal of the secular practice. In Maine's famous phrase, "contractus" replaced "status"; or, as Tönnies preferred to put it, "society" superseded "community"; or, in terms of the

present article, *instead of the economic system being embedded in social relationships, these relationships were now embedded in the economic system.*

While social classes were directly, other institutions were indirectly determined by the market mechanism. State and government, marriage and the rearing of children, the organisation of science and education, of religion and the arts, the choice of profession, the forms of habitation, the shape of settlements, the very aesthetics of private life—everything had to comply with the utilitarian pattern, or at least not interfere with the working of the market mechanism. But since very few human activities can be carried on in the void, even a saint needing his pillar, the indirect effect of the market system came very near to determining the whole of society. It was almost impossible to avoid the erroneous conclusion that as "economic" man was "real" man, so the economic system was "really" society.

Yet it would be truer to say that the basic human institutions abhor un-

mixed motives. Just as the provisioning of the individual and his family does not commonly rely on the motive of hunger, so the institution of the family is not based on the sexual motive. Sex, like hunger, is one of the most powerful of incentives when released from the control of other incentives. That is probably why the family in all its variety of forms is never allowed to centre on the sexual instinct, with its intermittences and vagaries, but on the combination of a number of effective motives that prevent sex from destroying an institution on which so much of man's happiness depends. Sex in itself will never produce anything better than a brothel, even then it might have to draw on some incentives of the market mechanism. An economic system actually relying for its mainspring on hunger would be almost as perverse as a family system based on the bare urge of sex.

To attempt to apply economic determinism to all human societies is little short of fantastic. Nothing is more obvious to the student of social anthro-

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pology than the variety of institutions found to be compatible with practically identical instruments of production. Only since the market was permitted to grind the human fabric into the featureless uniformity of selenic erosion has man's institutional creativeness been in abeyance. No wonder that his social imagination shows signs of fatigue. It may come to a point where he will no longer be able to recover the elasticity, the imaginative wealth and power, of his savage endowment.

No protest of mine, I realise, will save me from being taken for an "idealist". For he who decries the importance of "material" motives must, it seems, be relying on the strength of "ideal" ones. Yet no worse misunderstanding is possible. Hunger and gain have nothing specifically "material" about them. Pride, honour, and power, on the other hand, are not necessarily "higher" motives than hunger and gain.

The dichotomy itself, we assert, is arbitrary. Let us once more adduce the analogy of sex. Assuredly, a significant distinction between "higher" and "lower" motives can here be drawn. Yet, whether hunger or sex, it is pernicious to *institutionalise* the separation of the "material" and "ideal" components of man's being. As regards sex, this truth, so vital to man's essential wholeness, has been recognised all along; it is at the basis of the institution of marriage. But in the equally strategic field of economy, it has been neglected. This latter field has been "separated out" of society as the realm of hunger and gain. Our animal dependence upon food has been bared and the naked fear of starvation permitted to run loose. Our humiliating enslavement to the "material", which all human culture is designed to mitigate, was deliberately made more rigorous. This is at the root of the "sickness of an acquisitive society" that Tawney warned of. And Robert Owen's genius was at its best when, a century before, he described the profit motive as "a principle entirely unfavourable to individual and public happiness".

The reality of society

I plead for the restoration of that unity of motives which should inform man in his everyday activity as a producer, for the reabsorption of the economic system in society, for the creative

adaptation of our ways of life to an industrial environment.

No human society is possible in which power and compulsion are absent, nor is a world in which force has no function. Liberal philosophy gave a false direction to our ideals in seeming to promise the fulfilment of such intrinsically utopian expectations.

On all these counts, laissez-faire philosophy, with its corollary of a marketing society, falls to the ground. It is responsible for the splitting up of man's vital unity into "real" man, bent on material values, and his "ideal" better self. It is paralysing our social imagination by more or less unconsciously fostering the prejudice of economic determinism. It has done its service in that phase of industrial civilisation which is behind us. At the price of impoverishing the individual, it enriched society. Today, we are faced with the vital task of restoring the fullness of life to the person, even though this may mean a technologically less efficient society. In different countries in different ways, classical liberalism is being discarded. On Right and Left and Middle, new avenues are being explored. British Social-Democrats, American New Dealers, and also European fascists and American anti-New Dealers of the various "managerialist" brands, reject the liberal utopia. Nor should the present political mood of rejection of everything Russian blind us to the achievement of the Russians in creative adjustment to some of the fundamental aspects of an industrial environment.

On general grounds, the Communist's expectation of the "withering away of the state" seems to me to combine elements of liberal utopianism with practical indifference to institutional freedoms. As regards the withering state, it is impossible to deny that industrial society is complex society, and no complex society can exist without organised power at the centre. Yet, again, this fact is no excuse for the Communist's slurring over the question of concrete institutional freedoms. It is on this level of realism that the problem of individual freedom should be met. No human society is possible in which power and

compulsion are absent, nor is a world in which force has no function. Liberal philosophy gave a false direction to our ideals in seeming to promise the fulfilment of such intrinsically utopian expectations.

But under the market system, society as a whole remained invisible. Anybody could imagine himself free from responsibility for those acts of compulsion on the part of the state which he, personally, repudiated, or for unemployment and destitution from which he, personally, did not benefit. Personally, he remained unentangled in the evils of power and economic value. In good conscience, he could deny their reality in the name of his imaginary freedom. Power and economic value are, indeed, a paradigm of social reality. Neither power nor economic value spring from human volition; non-co-operation is impossible in regard to them. The function of power is to ensure that measure of conformity which is needed for the survival of the group: as David Hume showed, its ultimate source is opinion—and who could help holding opinions of some sort or other? Economic value, in any society, ensures the usefulness of the

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goods produced; it is a seal set on the division of labour. Its source is human wants—and how could we be expected not to prefer one thing to another? Any opinion or desire, no matter what society we live in, will make us participants in the creation of power and the constituting of value. No freedom to do otherwise is conceivable. An ideal that would ban power and compulsion from society is intrinsically invalid. By ignoring this limitation on man's meaningful wishes, the marketing view of society reveals its essential immaturity.

Freedom in industrial society

The breakdown of market-economy imperils two kinds of freedoms: some good, some bad.

That the freedom to exploit one's fellows, or the freedom to make inordinate gains without commensurable service to the community, the freedom to keep technological inventions from being used for the public benefit, or the freedom to profit from public calamities secretly engineered for private advantage, may disappear, together with the free market, is all to the good. But the market economy under which these freedoms thrive also produced freedoms that we prize highly. Freedom of conscience, freedom of speech, freedom of meeting, freedom of association, freedom to choose one's job—we cherish them for their own sake. Yet to a large extent they were by-products of the same economy that was also responsible for the evil freedoms.

The existence of a separate economic sphere in society created, as it were, a gap between politics and economics, between government and industry, that was in the nature of a no man's land. As division of sovereignty between pope and emperor left medieval princes in a condition of freedom sometimes

bordering on anarchy, so division of sovereignty between government and industry in the nineteenth century allowed even the poor man to enjoy freedoms that partly compensated for his wretched status. Current scepticism in regard to the future of freedom largely rests on this. There are those who argue, like Hayek, that since free institutions were a product of market-economy, they must give place to serfdom once that economy disappears. There are others, like Burnham, who assert the inevitability of some new form of serfdom called "managerialism".

Arguments like these merely prove to what extent economic prejudice is still rampant. For such determinism, as we have seen, is only another name for the market mechanism. It is hardly logical to argue the effects of its absence on the strength of an economic necessity that derives from its presence. And it is certainly contrary to Anglo-Saxon experience. Neither the freezing of labour nor selective service abrogated the essential freedoms of the American people, as anybody can witness who spent the crucial years 1940–43 in these States. Great Britain during the war introduced an all-round planned economy and did away with that separation of government and industry from which nineteenth-century freedom sprang, yet never were public liberties more securely entrenched than at the height of the emergency. In truth, we will have just as much freedom as we will desire to create and to safeguard. There is no *one* determinant in human society. Institutional guarantees of personal freedom are compatible with any economic system. In market society alone did the economic mechanism lay down the law.

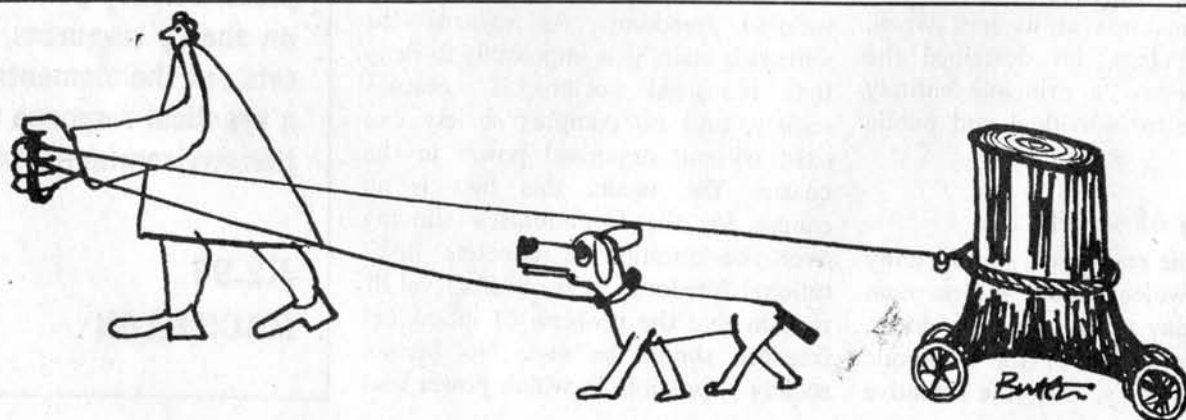
What appears to our generation as the problem of capitalism is, in reality, the far greater problem of an industrial

civilisation. The economic liberal is blind to this fact. In defending capitalism as an economic system, he ignores the challenge of the Machine Age. Yet the dangers that make the bravest quake today transcend economy. The idyllic concerns of trust-busting and Taylorisation have been superseded by Hiroshima. Scientific barbarism is dogging our footsteps. The Germans were planning a contrivance to make the sun emanate death rays. We, in fact, produced a burst of death rays that blotted out the sun. Yet the Germans had an evil philosophy, and we had a humane philosophy. In this we should learn to see the symbol of our peril.

Future Alternatives

Among those in America who are aware of the dimensions of the problem, two tendencies are discernible: some believe in elites and aristocracies, in managerialism and the corporation. They feel that the whole of society should be more intimately adjusted to the economic system, which they would wish to maintain unchanged. This is the ideal of the Brave New World, where the individual is conditioned to support an order that has been designed for him by such as are wiser than he. Others, on the contrary, believe that in a truly democratic society, the problem of industry would resolve itself through the planned intervention of the producers and consumers themselves. Such conscious and responsible action is, indeed, one of the embodiments of freedom in a complex society. But, as the contents of this article suggest, such an endeavour cannot be successful unless it is disciplined by a total view of man and society very different from that which we inherited from market economy.

Extract from: Our obsolete Market mentality by Karl Polanyi, Commentary, Vol 3, February 1947. Reprinted by permission of Commentary, copyright © 1947 by American-Jewish Committee.

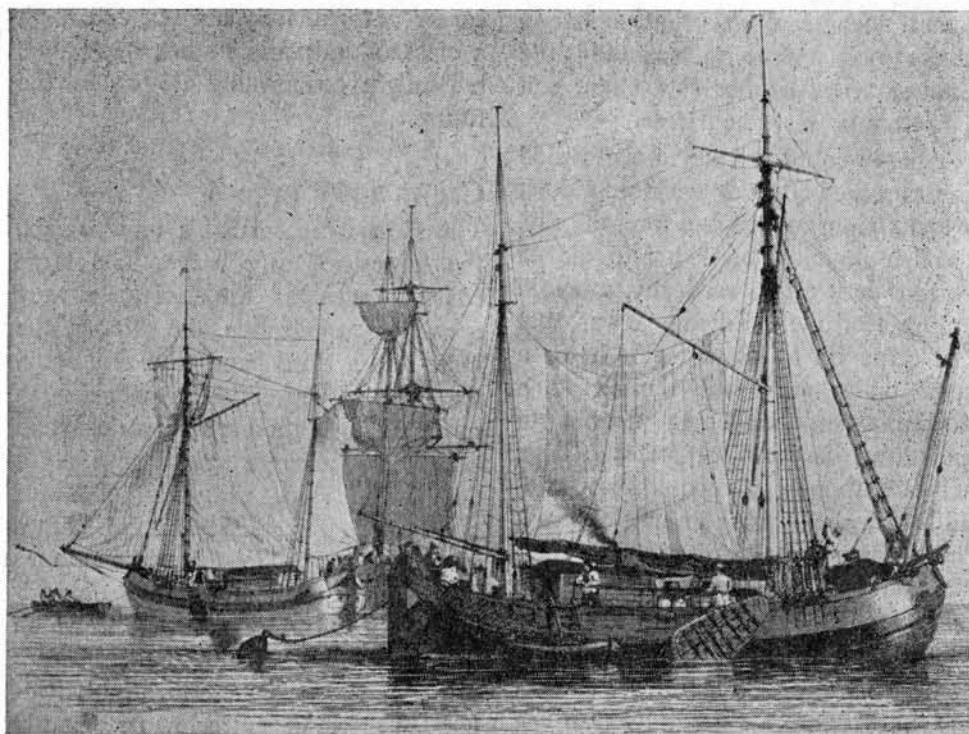


Sailing Barges of the Future

by C. McDonald

If there is one development over the next decade of which we may be sure, it is that the use of oil fuels for transport purposes will become less of an economic proposition, if, indeed, they continue to be freely available. That being the case our entire transport system will have to be revolutionised.

One suggestion is to increase the use of sea and other water transport, especially for bulk goods, but there remains the problem of power for the vessels. Sail could be one solution but large, deep-sea vessels, as well as the typical deep-draughted sailing hull, demand well-dredged channels and wet docks to accommodate them at their turn-round points. As to orthodox sailing vessels, one major nail in their coffin was their dependence on towage in or near port, and this applied as much to efficient schooners as to unweatherly square riggers. What is needed, therefore, is a short sea, non-hydrocarbon burning, cargo vessel, capable of operating independently of tugs, working into small, diversified ports in shallow water, able to work reasonably to a timetable, and not wasteful of building, manning or maintenance resources. All of which sounds a pretty tall, if not impossible, order. And yet there exists to this day a class of British sailing vessel, which has conclusively proved itself on all of the above counts, and a few more. It is the East Coast spritsail barge.



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Those familiar with the East Coast will need little introduction to the "sprittie", but for others, some explanation of her characteristics and history will be necessary. The barge hull is flat-bottomed, built in timber or steel, and relying on leeboards to sail to windward. They range in size from the little "Rainbow", loading 20 tons, to the steel-built "Will Everard", 280 tons, now in use as a yacht. The finer details of hull form and rig vary according to size and the trade for which they were built, coasting barges, for instance, having smaller hatches and higher rails, than those normally engaged in river work, and the larger barges often setting a proportionally larger mizzen, differently rigged; but, in basic form and rig, barges were all of a type. First known on the Essex coast in the early 19th century in something approaching their present form, they had developed by the end of the century into the form seen in barges surviving today. The barge fleet reached its peak, with over 2,000 craft registered, in the early 1900s. The inter-war period saw a gradual decline as barges lost freights to road transport, and the overall volume of cargo carried by the transport industry as a whole declined, and many of the craft laid up in the depression of the early 1930s did not trade again. By 1939 there were little more than 600 barges left under sail; the Second World War dealt a blow to the barge fleet from which it barely recovered. There were many casualties from mining and air attack, and craft

laid up or used as lighters without proper maintenance, were allowed to deteriorate beyond economic restoration. At the end of the war, the 1939 figure had been halved, and many owners converted their best and most modern craft to diesel power. During the 1950s, the dwindling fleet struggled on, losing more and more cargoes to auxiliary engined sailormen and motor barges, until, by the mid '60s "Cambria" was left the sole survivor under sail alone, with a few auxiliaries for company. Most of the auxiliaries, however, had by now turned over to engines alone. "Cambria" was sold for preservation in 1970, leaving only the auxiliary "May" as a semi-museum piece, still carrying occasional freights under sail, but essentially a king-sized yacht. Today, barges remain under sail, and some ex-motor barges are being re-converted, but only for use as yachts or holiday charter vessels.

Capabilities

The barge had two essential advantages over schooners and ketches of similar size, such as were used out of West Country ports. The first was their ability to sail in fully laden to a quay with, say, 150 tons of cargo, drawing 6 to 8 feet of water against the schooner's 10 to 14, and to sail away again empty without taking in ballast. Any schooner attempting this would have capsized as soon as she had her mainsail set, on account of her hull form. It was for this reason that the barge first replaced the schooner on the East Coast. The

second advantage was that a barge, thanks to her unique rig, was and is the handiest vessel of her size under sail in narrow or restricted waters.

A barge could sail up to a crowded tier of moored craft, or even into a dock or lock, under topsail and foresail only, with her mainsail brailed, and the 25 foot bowsprit raised vertically, to avoid fouling. Her one disadvantage was, that if it came on to blow really hard, a barge under way was limited to a certain extent, in being unable to send down her sprit, or reef the huge mainsail, though she could, and did, sail half-brailed through a gale of wind. There were accidents of course, but an investigation of barges lost shows that those claimed by the sea were for the most part, craft long past their prime, or, in many cases, with rotten sails and rigging, which parsimonious owners would not replace. To emphasise this point, there is the case of the sprittie which set out from Dover harbour in 1909, leaving a number of West Country schooners and ketches wind-bound there, loaded a stone freight from Portsmouth, and returned to Dover to find the schooners still weather-bound. There also existed a hermaphrodite rig, known as 'Half-sprit', which combined the sprittie's manoeuvrability with the ketch's sea-kindliness but was rather more expensive to install, and for this reason did not find favour with many owners, though generally liked by crews.

As to their effective range of trading, the so-called Thames barge wandered surprisingly far afield. In British waters, it was not uncommon for coasters to trade to the Humber or even the Tyne on one coast, and to Portsmouth and Southampton on the other, and the old-time ketch barges ranged even farther. But the sprittie's regular routes were into ports as far North as Great Yarmouth; and as far South as the Medway. Many barges also went foreign. They were engaged in incessant work between the major British ports, especially the port of London, and every harbour between Boulogne and the Scheldt, some barges trading even into the Rhine. As may be imagined these barges were of the larger class of coasters, ranging up to 280 tons in the Everards, and the giant 420 ton Friendship, which worked around the turn of the century, until run down in fog shortly before the First World War, an experimental craft whose successful

career unfortunately did not call forth a class of imitators in her own time, but might conceivably do so in the future.

Crews and Cargoes

The Friendship carried a crew of six, the largest of any barge. The large coasters such as the Everards were crewed by three men, the skipper, the mate and a third hand who was cook, seaman and apprentice in one, though not necessarily the hardest worked man aboard, for a barge was of necessity a democratic ship, with no room for quarterdeck officers. The smaller barges of up to, say, 180 tons, were sometimes two-handed, sometimes three, depending on the nature of the trade in which they were engaged. The smallest barges of under 120 tons, were invariably two-handed, if we except a few notoriously mean skippers of river barges who sailed single-handed, and the remarkable "Tubby" Blake, skipper of an auxiliary until the 1950s, who went single-handed to sea as well as on the river, because, as he put it, a crew was nothing but a liability!

Barges were capable of carrying an extremely wide variety of cargoes. Grain, root crops, sand, bricks, coal, machine tools, industrial chemicals and even kippers, were all grist to the mill. Indeed, one of their outstanding achievements was stack work, with a stack of hay or straw six to eight feet up the mainmast, and the mate standing on the stack shouting down directions to the skipper at the wheel. This was to supply the vast number of horses in Edwardian London, but the trade was revived in the 1950s with straw from Essex and Suffolk to the paper works on the River Swale, in Kent. With the wasteful practice of straw-burning in mind, and the need to manufacture paper from materials other than wood pulp, this is a trade which would stand revival. Barges not only served small industries, they built them. The mills at Mistley in Essex, the paper works referred to above, the saw mills at Maldon, the very towns of Clacton, Frinton and Walton, were built of material brought by sea, and the barges saw to it that the industries had reliable, economical transport, even, in many cases, after road and rail links had been established, for if a freight came from the site of its production or import to the factory, without the need for any

transport other than the barge, even the railways in their heyday could not compete. We are often inclined to think that the railways were the source of a dependable and cheap coal supply for Victorian towns, but most of the Essex coastal towns and gasworks were receiving their coal out of barges, at a lower carriage charge than even the Great Northern and Great Eastern lines could manage. This last was a regular trade well into living memory.

With the advent of large numbers of lorries, freights for barges began to decline. Paradoxically, the barges' freight charges under-cut those of the lorries even when contracts for sugar beet, bulk grain, building materials and animal feed were being transferred to road haulage. Perhaps this sheds some light on the psychology and limited intelligence of the managerial caste, in that they could not see that a mode of transport dating back to the dawn of civilisation was, in many cases, economically preferable to modern technology. A sad case of neophilia. It is clearly seen that the barge's staple trades were fairly closely linked with agriculture, with diversified small centres of industry, and with distribution from major ports to small ones. As industry became more centralised and demanded larger freights, it lost an invaluable servant, and put itself, and ourselves, in the clutches of road transport, as well as providing a classical example of the law of diminishing returns in the field of transport. It is, perhaps, not without significance that the end of the working barge's career coincided fairly closely with the early stages of the period of acceleration into the age of technologically based consumer capitalism which is now strangling itself all too slowly after perhaps 15 to 20 years' repulsive development.

As has been mentioned, the sprittie survives today only as a yacht or a museum piece; but they are by no means part of the long forgotten past, along with scythes and flails. There are many skippers of motor coasters today who came up in sail, and bitterly regretted its passing. The shipwrights and riggers who maintained the last auxiliaries until the early 1960s are still with us in large numbers; and most important of all, if barges are to sail again, any number of barges of the best period are still with us and under sail. For it is they that will set the

pattern for the barges of the future; in the first generation of craft, at least.

From past to future

Because a representative variety of the main types of barge has survived, it will be possible to examine them in practice, not only from the naval architects' point of view, as could be done from builders' drawings in the Science Museum, but from the seaman's and rigger's point of view. If, as seems inevitable, the ochre mainsails are unbrailled again within the next 10 years, there will be a plethora of small but vital questions to be answered, to which the naval architect can give no reply. How best to set the rake of a topmast? How much leeboard to give her when sailing to windward deep loaded? And how much when light? In heavy weather, should the topsail come in before brailing the main, or vice versa? Sailing a barge, like any other vessel, is not a science but an art, to be acquired only by constant practice, and the barge, by her sheer size and weight, demands the exercise of that art to perhaps the highest degree of all fore-and-aft rigged working craft. Therefore, the training of skippers and mates in working sail should begin again at an early date, if we are not to be caught with our trousers down. The barges now in use as yachts or charter vessels should be bought now for use as training ships, under the supervision of men who were skippers under sail. It will not be too hard to find future crews among school leavers. Apart from the fact that when sail returns, it will not again be eclipsed in our lifetime, it has always exercised an attraction not far short of being hypnotic—ask any bargeman who has been in sail—and will doubtless continue to do so. As well as school leavers, a major sector of labour in the Port of London, namely lighterage, is in serious decline, largely due to the adoption of container handling. Lightermen are highly skilled watermen, with a well-known pride in their trade. Most of the younger men, given the chance to remain afloat in sailing barges, would grasp the opportunity with both hands, and have far less to learn than the school-leaver apprentice.

On the subject of crewing, one necessary difference between old barging and new would be the method of payment of crews. In the old days, freight money was divided between the

owner and crew. The crew's share was subdivided, depending on the number of crew, but in the two handed barges, two-thirds to the skipper, one-third to the mate.

There are many skippers of motor coasters today who came up in sail, and bitterly regretted its passing. The shipwrights and riggers who maintained the last auxiliaries until the early 1960s are still with us in large numbers; and most important of all, if barges are to sail again, any number of barges of the best period are still with us and under sail.

No cargoes, no money, and the crew found themselves on the dole, often many miles from home. In the future, if a barge is temporarily unemployed, it is vital that her crew should not be. By all means keep a bonus system on freights delivered, but the crew should have a guaranteed salary. This would be particularly important in the early stages of reorganisation, while we are still finding our feet. It is also well worth considering, whether we could improve on the old crewing scales. At the end of their career, barges were often under-manned for their size, in an effort to make the crew's share of the freight money go further. Better was the manning scale of the 'golden age' of barging, when most craft of 150 tons upwards were three handed. As the smallest barge under modern conditions would be likely to load at least this amount, three men should be the rule; the third hand could well be one of a pair of apprentices, serving turn and turn about between a block release course ashore, and sea duty. In the larger barges, generous manning scales should also apply. We have been long used to mechanical power, but the sea has not changed. The lifeboat crews would not welcome a return to short-handed barges, and neither, it is to be hoped, would anyone else.

Not only could, and should, manning scales be improved; so might comfort aboard. Barges were always comfortable craft by sailing-ship standards, their cabin a warm, and usually dry, retreat; but a new class of barge should be provided as a matter of course with a proper lavatory and shower, electric

light from storage batteries, possibly charged by a wind generator, and, above all, with radio. The lack of contact with the shore except by visual signal was, in the old days, one of the most detrimental factors to a barge's safety, and, in many respects, to her efficiency, for, once at sea, the skipper could not be informed of any change of plans that might be made regarding his destination or next freight. Although, with the reintroduction of sailing vessels, we should be returning to the methods of sixty years ago, it will be necessary to guard against a bad heritage slinking back along with the good, and, considering that much of our information would come from the earlier period, this is perhaps a greater peril than it might seem.

What kind of barges?

Before considering the design of the new barges, it will be necessary to decide their probable duties, for it would be of little use to construct a superb new class of deep-sea ketch barges to work in and out of London and Tilbury docks and trade to towns away up tortuous creeks. This question is complicated by the fact that we must make predictions as regards the future population and industrial operations of our existing towns and countryside. One fairly safe major prediction is that agriculture would become considerably more labour intensive, and that British farms would have to supply a greater proportion of home consumption than at present. A second is that certain industries, the motor and engineering ones in particular, will be radically altered, and their plant and labour force will be transferred into other more essential fields. With transport at a premium, it will be necessary to bring the works which process agricultural produce closer to the farm. This will particularly apply to mills processing animal feedstuffs and fertilisers. Where these have to be supplied from the outside with raw materials, or their produce is intended for use in another area, it is quite likely that water transport can be utilised, and will be the most efficient for the bulk cargoes associated with this trade. Canning works, likewise, could be situated at points where they could be served by water transport either in whole or in part. A glance at the map of East Anglia shows a plethora of suitable sites for such works. In many cases, new industries

could with profit be brought to water-side towns. Where paper works have of recent years been served by timber ships from Russia and Scandinavia, with timber at a premium, it will be necessary to change to straw processing, and to recycle old paper. Here, if ever there was one, would be an opportunity for the barge. With a good deal of the paper produced going to urban centres, it could be taken by barge to an existing railhead, without the cost of laying a new line. Most of the conurbations producing waste paper in Eastern England could be served without difficulty by water; and stack work from creeks to factories and cities was an old staple. This would suggest that the barges needed must include a class of bulk carriers capable of loading a great volume, and with a stack capability.

The need would probably be best met either by the sea-kindly bulk carriers built in the 1920s at Mistley, in Essex, or by the earlier wooden stack barge designs of John Howard, of Maldon, also in Essex, the latter being considered by many bargemen to have been unchallenged for handiness under sail.

It is certain that, in the early days of an acute fuel shortage, our existing resources of coal would be heavily in demand. Probably, as well as new pits, old ones would have to be reopened. With greatly increased demands on them in other fields, the railways would need assistance to transport these increased coal freights. Here, again, is an old staple barge trade. This calls for a good seagoing ship, with as large a cargo capacity as possible. Here, the immediate and unchallenged answer would be the 280 ton "Everard" class, built of steel in the 1920s for quite similar conditions of trade.

Smaller barges of some 150 tons, might do a power of good work on the East Coast as a distributive vessel. For example, London and other conurbations dispose of an astronomical amount of treated sewage sludge by taking it out to sea and dumping it, when it would provide an ideal organic fertiliser. (Some local authorities sell dried sludge for this purpose.) If all of London's sludge were consigned for fertiliser, the shape of the 'bargemen's coast' is such that a barge with a bulk cargo of fertiliser could be brought within a short distance of any farm in three counties, reducing the role of road

transport to the much more appropriate one of a short haul with a full load of fertiliser for one farm, instead of convoys of lorries bringing the stuff 50 miles from the metropolis and having to return the same 50 miles light, which effectively makes such a trade uneconomic at the present time. For this trade, once again, a copy of one of Howard's Essex barges would suit admirably, for their light draught enabled them to trade up tiny creeks, into the countryside, within close reach of the farm. And if they could work up creeks for stacks in 1900, there is no reason why they should not bring fertiliser and take vegetables away, as well as straw stacks for the paper mills, in 1980.

Still in the field of the coast-hugging river trade, new industries mean new building, and building calls for sand, cement and bricks. Good quality building sand is at the moment being dug in South Essex, and on the Colne, and sent here, there and everywhere in puny 20 ton loads by lorry. Both the areas in question are quite close enough to navigable water to merit a light railway connection, and there are many other pits in a similar situation. In a

new age of barging, with no coasters yet retired, but the construction trade a priority, it would seem that a new class of bulk carriers on coaster lines was indicated, perhaps of some 250-300 tons capacity, but not needing the deep-sea features of the coaster, such as small hatchways, high bulwarks and a pronounced sheer, which the pensioned coasters found a nuisance in their new trade. Bricks, on the other hand, while being a barge "natural", would call for a smaller vessel.

Having set out some of the more outstanding cases for the reintroduction of sailing barges, a fairly clear picture of the vessels required emerges. First and foremost come the Howard designs, as used for stack work, or, in their modern guise, also for general agricultural work; for the sludge trade, for bricks, and for general distributive work. The nature of these trades would seem to indicate a craft of some 150 tons capacity. If the author were to be asked to name a vessel of this class to be copied, the first one springing to mind would be the "Mirosa", still with us as a yacht barge, and taking a successful part in racing, which speaks well of her sailing capacities. The next



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most numerous class might well be of a type of 280-300 ton coasters, after the lines of the "Will Everard", but possibly half-sprit rigged. In this case, there would be no difficulty in building in steel, for the "Will" is of steel herself. Thirdly would come their cousins, the sand, cement and rubbish barges, no doubt copies of their more aristocratic sisters as regards hull shape, but with less sheer, larger hatches, and, of course, sprit-rigged, as they would not have to stand up to the same arduous conditions as the coasters.

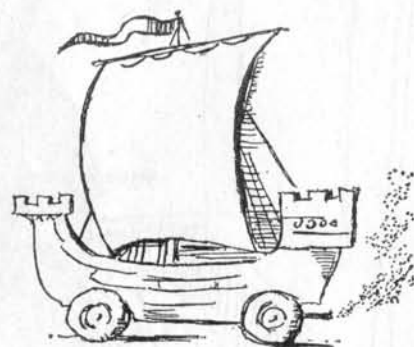
important advantages to the steel hull. steel? There are a number of highly important advantages to the steel hull. Firstly, they are a positively water-tight form of construction, especially when welded; which would obviate the back-breaking pumping which was a regular part of the bargeman's life. Secondly, the barge takes many hard knocks in her working life, and it is arguable that they are more easily repairable in the steel hull than the wooden one. Thirdly, an ageing wooden barge demands an increasing amount of maintenance, to a far greater degree than her steel sister. Lastly, but not the least important, more steel barges could be built in a given time by a given number of yards than wooden ones, and the standard of workmanship would no doubt be higher, for highly-skilled shipwright carpenters are thinner on the ground than highly-skilled ship-builders in steel, and will no doubt be so for some years yet!

Modern materials will serve not only for hulls, but for spars and rigging. Steel masts and sprits were in use in some of the late Mistley coasters, and improvements in the field of metal spars in recent years could well play a part in making barges more reliable. Steel wire has also greatly improved, and modern shrouds would surely be set up with rigging screws rather than the picturesque but inefficient deadeyes and lanyards. Perhaps the greatest problem is in ensuring that sailing a barge is a job of work rather than a test of endurance. The key to this is probably in her winches. In the sailing barge, there is a prodigious amount of pully-hauling work about the deck. Each leeboard is provided with a small geared winch for raising and lowering. There is a general purpose set of winches on the mast case for the hal-yards, though this is a less exacting

job; but the true instrument of torture is the massive anchor windlass on the foredeck. The author can speak with feeling in asserting that cranking in 30 fathoms of $\frac{7}{8}$ -inch iron cable and a 4 cwt. bower anchor in the teeth of an Easterly blow, is no rest cure! To take the torture out of this, two sources of power are available, electric and hydraulic. It is questionable whether even a large bank of storage batteries would be capable of hauling the barge up to her anchor in really hard conditions, which would suggest the use of some form of hydraulic accumulator, pressurised by a wind-driven pump; or, it might be considered a high enough priority to install a small stationary engine for this purpose, as this could not possibly account for more than an hour's running in a day's work. The point of this digression is, of course, that while a crew could *strain* at the winches as they did before, it would be grossly unreasonable to expect them to do so except in cases of breakdown. On the subject of a barge's equipment, a major point in favour of the construction of standard classes of barges, is that certain items of gear, such as winches, rigging screws, wheelgear, lifeboat and lamps, to name but a few, could be standard in all barges, while

sails and rigging could be standard within a class.

Many of the ideas suggested here would no doubt make the skippers of the 19th century turn in their graves. Barge enthusiasts and antiquarians will no doubt feel that a new barge fleet along these lines would not hold a candle to the old ships. Be that as it may, any one of them, within the next 10 years, will see sights which they expected to vanish in the early 1960s, for by then, the towering topmasts, the ochre sails, the music of wind, wire, cordage and water, will belong not to a vanishing era, but to a prosperous future, which they will continue to support as long as there are cargoes to be carried, and a sea on which to sail.



THIS MONTH'S AUTHORS

Karl Polanyi was a distinguished economic historian. Author of *The Great Transformation* 1957; *Anthropology and Economic Theory* (with Morton Fried) 1959; *Trade and Market in the Early Empires* (with K. C. W. Arensburg and H. W. Pearson) 1957; *Dahomey and the Slave Trade* (with A. Rotstein) 1966; and numerous articles.

Credo Vusamazulu Mutwa is a practising witch doctor in a township outside Johannesburg. His father was a Catholic, but his mother refused to be converted. In 1958 Mutwa renounced Christianity and underwent the Ceremony of Purification so that he could train as a witch doctor. MY PEOPLE has been compiled from his two books *Indaba, my Children* and *Africa is my witness*.

Colin New is lecturer in Production Management at the London Graduate School of Business Studies.

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

C. McDonald. Born in Essex in 1946 he spent all his free time as a youth in a sailing auxiliary. By the time he left school the sailing barges were fast declining and he had to choose between serving in a motorised vessel or going to the L.S.E. Not without pangs of regret he chose the latter and now devotes his time to research into the inshore fishing industry in East Anglia.

CAN WE ABOLISH PACKAGING?

by COLIN NEW



Packaging has come in for a good deal of criticism in recent years, firstly from environmentalists concerned with the problems of litter and pollution and secondly from those who see packaging as an unnecessary "waste" of natural resources including energy. On such an emotive subject it is perhaps essential to establish at the outset that I have no personal stake in any part of the packaging industry. I shall attempt to draw together the various pieces of available information in order to arrive at a rational rather than emotional evaluation of the role which packaging plays in depleting natural resources and polluting the environment.

The Function of Packaging

In general, packaging materials have a multifaceted role to play: they provide "containment" for the goods, they protect, isolate and quantify the contents, they sometimes allow inspection of the contents without access and they are often designed to draw attention in some way to the contents.

It is pertinent for us to ask which of these functions is *necessary* and which is *unnecessary*, since only then could we decide on an "absolute" level of packaging which is acceptable. Unfortunately this inevitably forces us into a subjective decision, and one on which few people could agree. Let us first consider the total packaging industry and then return to this question with a clearer view of the whole.

be just over £1,000 million per annum, of which 75 per cent is for "consumer-use", i.e. is not used purely functionally in industrial applications. A rough breakdown of this figure by materials used is:

	£m
Paper	420
Plastics	150
Metal	320
Glass	150
All	1040

Now, while these figures may initially look quite high in money terms we should consider them in relation to the total usage of these materials and in relation to the known world reserves of these materials. It is convenient to do this by considering each segment in turn.

Paper

Paper is unique in that, coming from a renewable resource, its supply is not

constrained by existing or forecast levels of "reserves" but is under man's control—at least in the longer term. Current shortages of e.g. newsprint are a consequence of inaccurate planning some thirty years ago rather than of a depletion of a fixed resource. One should, however, bear in mind the fact that reforestation is constrained by land availability and this itself may be affected by population growth.

Total paper consumption in the UK is about 7.5 million tonnes or about £1,000 million p.a. so that some 42 per cent (3.1 tonnes) of UK paper consumption is used for packaging purposes. However, by volume about 40 per cent of all paper is recycled so that the total usage in "new paper" is of the order of 4.5 million tonnes p.a.

The Size of the Packaging Industry

Total current sales level in the UK of all packaging materials is estimated to

With acknowledgment to A. Braithwaite, D. Collas, L. Greeves and P. Hill, the Masters students who collected much of the basic information for this article.

Plastics

It is estimated that a maximum of 6 per cent of the total volume of crude oil used in the UK is used in the manufacture of plastics and, of the total production of plastics, about 40 per cent is used for packaging purposes. The total UK consumption represents some 1.5 tonnes of plastics.

Forecasts of the time which reserves of crude oil available with current extraction methods will last vary widely, a figure of the order of 50 years at current usage levels seems to be reasonable. However, this does not include oil sand and shale reserves, which become increasingly viable sources as the price of drilled oil increases. In any case it is clear that the 2.4 per cent of UK crude oil consumption used to produce plastic packaging is a fairly insignificant contributor to the depletion of total world reserves.

Metal

The principal materials used for metal packaging are tinsplate, aluminium and steel (mostly for industrial use). The amount of steel used in packaging amounts to one million tonnes per annum, or about 5 per cent of total UK usage. The tin which goes on most of it to form tinsplate, however, is a much more significant proportion of national usage. About 1 per cent of tinsplate is tin, corresponding to a usage of about 10,000 tonnes per annum, which is over half the total annual tin consumption of the UK. The world reserves of iron ore and tin are again often disputed and the expected rate of growth of use even more so. However, at current usage rates we have about 1,000 years stock of iron ore but only 30 years stock of tin. The world stock of coking coal necessary to produce steel would last at least as long as the stock of iron ore. In addition to these major elements, we must consider the use of lead in the soldering necessary to produce cans. Total annual usage of lead in the UK is about 350,000 tonnes but only about 5,000 tonnes is used in packaging; however, world reserves could be depleted by the end of this century.

There are some factors acting in the industry itself to help reduce the usage of tin, and outside the industry a technological breakthrough in the field of non lead acid-batteries would safeguard the supply of lead indefinitely.

Within the industry we might note that the average thickness of the tin-coating on UK tinsplate has fallen from 22.88 g/m² in 1955 to 11.20 g/m² in 1970, which despite the increase in demand for tinsplate packages led to a drop in tin usage from 11,470 tons in 1960 to only 7,965 tons by 1970. However, such reductions cannot indefinitely continue.

Tinsplate is being replaced in some applications by drawn aluminium cans. Currently about 10 per cent of the total annual UK usage of aluminium (560,000 tonnes) is used for packaging, though this is growing rapidly as it becomes more price competitive with tinsplate. At current usage rates world primary reserves of aluminium would last for 800 years and there are secondary reserves which would considerably extend this.



Glass

Despite the recent outcry over the supply of glass bottles there is no genuine shortage of materials for their manufacture—only in the manufacturing capacity available. Glass is basically made from sand (50 per cent), soda ash (16 per cent), limestone (12 per cent) and recycled glass or cullet (20 per cent). None of these are in short supply. Furthermore, in relation to the proportion of these materials used in the packaging industry, only soda ash (made from salt and limestone) reaches a significant proportion—27 per cent of total annual usage. Sand (only 2.4 per cent used in packaging) and limestone (0.6 per cent) are mainly used in the construction industry. The tonnages involved are around 45,000 tonnes per annum for each of sand and limestone, but only 1,500 tonnes per annum for soda ash.

The depletion of Natural Resources

In reviewing the use of materials in packaging we see therefore that in the main, packaging is an insignificant

proportion of total usage of materials. Less than 3 per cent of oil consumption goes to produce plastics for packaging, less than 5 per cent of steel, less than 2 per cent of lead and only about 10 per cent of aluminium are used for packaging. Materials for glass containers are not only an insignificant proportion of total usage but they are also in plentiful supply.

We are, therefore, left with paper and tin as the only items which packaging is depleting significantly at the present time, with the use of aluminium of growing concern.

To some extent the substitution of aluminium cans for tinsplate cans is merely transferring the problem. However, other developments such as the chemical treatment of steel to give tin-free steel cans is likely to provide an answer for some applications. The reserves of tin are in any case likely to be fairly conservative—reserves were quoted as 30 years in 1931 and only 12 years in 1965, and as the price of tin increases it becomes economically viable to produce from hitherto uneconomic sources.

Paper is a rather different problem. About one-quarter of all "new paper" is used in the packaging industry and this is a significant use of the material. Although the supply of paper will always depend on the pre-planning of forested areas there is pressure for land for other purposes (particularly food) and this is likely to increase. New technology for the pulping of tropical hardwoods with a gestation period of five years (as opposed to twenty for traditional pulpwoods) would provide a major breakthrough, but for the present paper usage is a cause for concern.

Energy of Conversion

The manufacture of packaging materials clearly requires energy, at both the material extraction stage and the forming stage. This energy is just as much a use of natural resources as material usage and in the current situation this may be thought more important. Table 1 shows the amount of energy required to produce one tonne of packaging material. We may note the very high extraction cost of aluminium (an electrical process) and the relatively high conversion costs of plastic and glass (hot forming). The table is arranged in ascending order of energy requirements. However, it must be

appreciated that, for example, aluminium has a density only one-third that of tinsplate and because of its strength can be used in thinner sections. Similarly glass must be used in much thicker sections than plastics so that it too is not so attractive as at first sight. The point is that a tonne of glass will not in fact provide anything like the same volume of "containment" as a tonne of plastic.

The total energy used to produce the packaging used in a single year in the UK is of the order of seven million tons of oil equivalent, of which over 80 per cent is used to extract the raw materials. This represents an energy usage of 2,800 million therms a year, about 4 per cent of total energy consumption and enough to run the whole of London for six months.

In the current energy situation it would seem that we must regard this 4 per cent of energy use as significant and turn our attention to the problem of the alternatives to current packaging practice.

Is Packaging Necessary?

The role which packaging plays in our current life-style is clearly related to the methods of distribution employed. In the days of the corner shop it was acceptable to have biscuits weighed out from a large tin by a grubby-handed assistant, or flour scooped out from a large open sack on the shop floor. In the days of the supermarket it is necessary to contain, protect, isolate and quantify your biscuits at a location remote from the eventual consumer. The benefits in terms of hygiene which this allows has been more of a spin-off than an objective.

On the other hand we have the case of a man's shirt which comes in a sealed cellophane bag with cardboard former, plastic collar support and a multitude of steel pins—is this "necessary" packaging?

Let us consider the definition of "unnecessary" on three levels:

- (1) Unnecessary packaging is packaging which would be avoided if alternative means of distribution could be used which did not require it.
- (2) Unnecessary packaging is packaging which is designed for the convenience of consumers or for marketing purposes, and which would be avoided if simpler (and cheaper) packaging was used.

- (3) Unnecessary packaging is packaging which *under present distribution systems* is more than adequate to ensure safe distribution and provide a reasonable level of consumer convenience.

Under definition (1) we would be forced to conclude that all packaging except that in bulk, e.g. sacks, drums, crates, is unnecessary—except that we have to allow for extra packaging at the retail outlets for weighing out, etc. Under definition (2), while allowing our existing distribution network we must rule out fancy packaging used for marketing purposes, easy-open cans, one-trip bottles etc but definition (3) would draw the line at plastic bottles of cosmetics in fancy boxes, and jars of cheese spread in cardboard cartons.



It is clear that definitions (2) and (3) are fairly close, since the share of total packaging which the difference between them would make "unnecessary" is probably only about 2-3 per cent. The major difference concerns whether or not we accept current distribution methods—if we accept definition (1)

we would probably consider that there was a 60 per cent net excess of packaging (allowing for extra packaging at the point of ultimate sale). On the basis of definition (3) it would seem difficult to regard even 20 per cent of current expenditure on packaging as "unnecessary".

The economic arguments for this statement depend basically on the fact that all packaging costs are eventually met by the consumer. In the case of most food products, manufacturers are unlikely to spend more than is absolutely necessary for "safe distribution". The example of the crush-proof biscuit pack may be quoted; although this is available from packaging manufacturers so far little use has been made of it because of the extra cost involved—probably about 0.5p per packet. On the other hand it is not hard to find examples of excessive packaging in such goods as cosmetics and perfumery, toys and some articles of clothing. However, the packaging used in these items is a relatively small proportion of the whole. In general we would expect to find margins which may be used for "unnecessary" packaging when: packaging is used as a strong marketing instrument to encourage impulse buying or to attempt product differentiation; marketing expenditure is relatively high and usually profit margins are also high.

We are therefore led to conclude that if we are to accept our present life-style, involving as it does a complex distribution system, less than 20 per cent of all packaging can be regarded as "unnecessary". Furthermore, because of the type of goods usually sold in such packaging a relatively smaller proportion of metal and glass packaging could be classed as unnecessary. Table 2 shows one estimate

Table 1 — Energy required (in tons of oil equivalent — toe) to produce 1 tonne of packaging material

MATERIAL	Energy required to produce 1 tonne of raw material	Energy required to convert raw material to packaging	Total energy required to give 1 tonne of packaging
GLASS	0.3	0.2	0.5
TINPLATE	1.0	0.2	1.2
PAPER	1.45	.15	1.6
PLASTICS	2.3	0.6	2.9
ALUMINIUM	6.0	0.3	6.3

NOTE: 1 ton of oil equivalent is the energy obtained from burning 1 metric ton of oil — about 400 million therms.

of the amount of unnecessary packaging while maintaining current life-styles.

Packaging and Pollution

The environment suffers pollution from the use of packaging during its manufacture and as a part of the production process and on its disposal after use.

In the production stage we have already seen that in most cases materials used for packaging are a small proportion of total production of the material. The packaging industry contributes only about 2 per cent to GDP so that although some of the pollution caused by the materials production industries is attributable to packaging the proportion is quite small.

On disposal, packaging becomes either refuse (collected and disposed of centrally) or litter (randomly distributed—sometimes later collected and disposed of centrally).

Some collected waste is recycled—currently about 40 per cent of all UK paper production is recycled and about 20 per cent of glass. The remaining waste is used for landfills (about 80 per cent) or is incinerated (about 20 per cent).

Actual re-use of packaging has so far been limited to the “returnable glass bottle”. Re-use is limited mainly by distribution methods (the need for closed circuits such as milk bottles) and the problems of cleaning. It is unlikely that re-use could become feasible for anything except the glass bottle.

The problems of recycling are basically those of the economics of collection of uncontaminated waste.

The 11,000 million tinplate cans used every year in the UK could be recycled—provided the housewife kept a bin solely for them. Obviously the more recycling which can be done the less packaging will use up scarce natural resources.



Litter is an aesthetic problem and a safety hazard, it is not in general an ecological problem. Apart from paper, which will degrade biologically over time, the other packaging materials are inert—glass and plastic are non-degradable and cans merely rust. It is therefore conceivable that if large amounts of paper are allowed to degrade this could have an impact on the biosphere. In passing, we might raise a question which hangs over the future of the light-degradable plastics which have received considerable attention in recent years. It is conceivable that dumped normal plastic bottles are in fact less likely to disrupt the biosphere than degradable ones, since little is known of the eventual nature of the

decay products. The solution to the problem of litter lies in the aesthetic desires of our society, it is in no way a technological problem.

Conclusions and some prescriptions for action

The £1,000 million per annum packaging industry is a significant factor in the depletion of only two natural resources—paper and tin. Paper is a renewable resource rather than a fixed reserve, so that management of its supply and use is the critical problem.

Tin is likely to become more expensive to extract as time goes on and the substitution of aluminium will merely transfer the problem. The use of chemically-treated tin-free steel is a possible contender to replace tinplate but may well involve other problems.

It is unfortunate to note that one of the materials of which packaging is a significant user—namely paper and board products—is probably one in which most unnecessary packaging occurs. This could be reduced quite quickly by manufacturers avoiding the many double-packaging arrangements currently in use. It is unlikely that the other significantly used material, tin, is used unnecessarily to any great extent. The answer there must lie in substitution and technology. Again, the excessive use of plastics could readily be discontinued if companies chose to do so—however, for marketing reasons they may well choose not to do so.

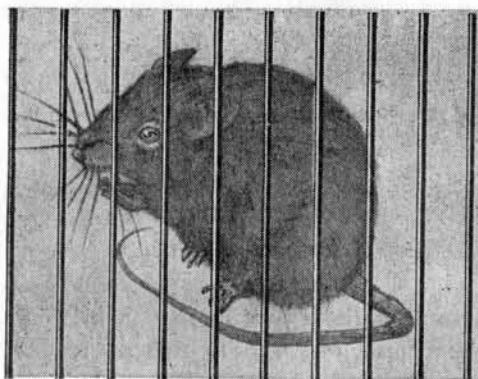
With regard to energy use, it would seem that packaging does take up some 4 per cent of our total UK energy consumption and as such is fairly significant. However, we have seen that if we are to continue in our present life-style this could only be reduced by about 3.3 per cent.

Packaging is not a significant factor in the pollution of the biosphere.

If we are willing to abandon current life-styles including all our convenience foods (i.e. cans, frozen foods, etc.), we could probably cut packaging back to 40 per cent of its current level; however, the other economic and social costs of such a change are enormous. One thing is clear, it is not packaging which is “on trial” here, but our whole style of living—if we wish to continue living as we do we must accept all of the current cost of packaging. If not that is quite a different question.

Table 2 — Unnecessary Packaging with Current Life Styles

Material	Total Market £m	% unnecessary	Value of unnecessary packaging £m
Paper	420	40	88.0
Plastics	150	30	45.0
Metal	320	5	16.0
Glass	150	10	15.0
Total	1,040	16%	164.0



Journal Review

Journal Review's intent is to demonstrate to readers what a mass of authoritative ecological and environmental information is available to them in the scientific literature and to encourage them to consult these journals whenever they need to get to the bottom of a problem. True, many journals are technical, but not so technical that, say, a sixth-former at school might not derive benefit from them. *Journal Review* does not aspire to provide anything approaching a "plain man's guide to the scientific press".

Erratum

An important printer's error found its way into our May issue's account of *Lead over-absorption in a population of oxy-gas burners*, *Nature*, 247 (5435) 53 (1974) Blood lead levels should read 40 $\mu\text{g}/100\text{ml}$ and 80 $\mu\text{g}/100\text{ml}$, not 40g/100ml and 80g/100ml. This is a million-fold error and at the latter figures we would have something approaching a lead soldier rather than a human being!

Rabies in France

The Veterinary Record, 94 (19) 448 (1974) states that the incidence of rabies reported in animals doubled between 1972 and 1973, and looks like doubling again in 1974 as the disease advances slowly south-westwards into the country. Foxes provide the main wildlife reservoir of the disease.

Environmental lead pollution near lead works

A. E. Martin, *Proceedings of the Royal Society of Medicine*, 67 (2) 165 (1974), discusses blood lead level determinations made for families living near lead works. Studies began after environmental lead contamination was noted in the London Borough of Tower Hamlets. Generally blood lead was not elevated in families living more than about 550 yards from a works. Although no clinical symptoms of lead poisoning were found, 41% of the 39 children sampled living closer than about 440 yards to the Tower Hamlets works had high (greater than 40 $\mu\text{g}/100\text{ml}$) blood lead levels.

Does lead pollution influence intelligence and behaviour?

R. G. Lansdown, B. E. Clayton, P. J. Graham, J. Shepherd, H. T. Delves, W. C. Turner, *Lancet*, (7857) 538 (30 March 74). Studies for East London children living in a lead contaminated environment near a smelting works did not show any connection between blood lead level (up to 79 $\mu\text{g}/100\text{ml}$) and any measure of mental function.

Launching the synthetic fuel industry

R. Gillette, *Science*, 183 (4125) 641 (1974). A report of moves afoot in the US to produce oil and gas from coal and shale deposits. E. F. Osborn, *Science*, 183 (4124) 477 (1974). A US scientist looks at America's coal resources and demands their greater use to make his country self-sufficient in energy. Oil and gas should be in commercial production from coal in a decade.

Towards the hydrogen economy

I. G. Nixon, *Chemistry in Britain*, 10 (5) 179 (1974). Two new processes being pioneered at the University of Sussex for the large scale production of hydrogen are described.

Hydrogen, a clean fuel?

E. J. Griffith, *Nature*, 248 (5447) 458 (1974). It is supposed that hydrogen burns to give only water. This paper shows that it can also form large quantities of hydrogen peroxide and is not automatically pollution-free.

Methyl alcohol, a versatile fuel for immediate use

T. B. Reed, R. M. Lerner, *Science*, 182 (4119) 1297 (1974). Methyl alcohol, derived from coal, wood, farm wastes, etc., provides an immediately usable alternative fuel, of value in the period while alternative technologies are developed to solve the fuel crisis. Up to 15 per cent methyl alcohol, it is stated, may be added to petrol without car engine modification. Ethyl alcohol (ordinary alcohol) produced by fermentation of agricultural products also has possibilities as a fuel (see also *Science*, 183 (4126) 608 (1974)).

DDT damage in 1948

D. B. Peakall, *Science*, 183 (4125) 673 (1974). A recent study on museum egg specimens shows that even in 1948 sufficient DDE (a DDT breakdown product) was present in peregrine eggs to account for egg-shell thinning.

Pollution of the North Sea

G. Weichart, *Environment*, 16 (1) 12 (1974), reprinted from *Ambio*, 2 (4). Weichart, of Hamburg University, has gathered some telling facts on the extent of North Sea pollution.

The conception of nature in Japanese culture

M. Watanabe, *Science*, 183 (4122) 279 (1974). "Nature for the Japanese was different. It was an object, not of his mastery but of his appreciation, and was even his best companion."

Air pollution: beware most the tiniest particles

D. F. S. Natusch, J. R. Wallace, C. A. Evans, *Science*, 183 (4122) 202 (1974). Toxic arsenic, antimony, cadmium, lead, selenium and thallium, if present in coal as trace components, will be present in the smoke when the coal is burned. A study of smoke emissions from coal-fired power stations shows that these components are preferentially concentrated in the very smallest particles present. In this form they are most difficult to remove by conventional pollution control devices, they are most easily inhaled deep into the lung, and, once there, the toxic substances are most readily taken into the blood-stream.

Mining the sea for manganese nodules

Reports in *Science*, 183 (4124) 502 (1974) *Science*, 183 (4125) 644 (1974) and *Chemical and Engineering News*, p. 19 (11 Feb 74). Nodules, rich in manganese, nickel, cobalt, copper and molybdenum, litter the deep ocean-bed south-west of Hawaii and elsewhere. Increasingly regarded as an exploitable natural resource, this January America's Kennecott Copper Company launched a programme aimed at mining 3 million tons/year of these nodules by 1980. To this end, a \$50 million, five-year research programme is to be undertaken by an international consortium of major metal producers.

Wildfowl and Tay sewage

B. Pounder, *Marine Pollution Bulletin*, 5 (3) 35 (1974). Large numbers of over-wintering northern-European wildfowl feed close to sewer outfalls in our estuaries. Flocks feeding off Dundee's untreated sewage outfalls in the Tay, while being repelled by most industrial effluents, are attracted to the domestic sewage and food industry waste outfalls. Direct benefit seems to accrue particularly to flocks of Goldeneye.

Controlling cars or car pollution?

R. J. Naumann, *Science*, 183 (4125) 595 (1974), estimates that the US motorist will spend \$20,000 million per year if the 1976 US car emissions standards (90 per cent pollution reduction) are to be implemented. Wouldn't it be wiser to spend that much money on public transport systems and other schemes that will make the actual use of the car less necessary, he asks. The substantial car pollution reductions achieved in the US by 1973 were obtained relatively cheaply. Further reduction would be increasingly more expensive.

Lead in petrol

F. D. Porter, *Chemistry in Britain*, 10 (2) 61 (1974), believes that tetraethyl lead anti-knock in petrol should be replaced by more effective tetramethyl lead. Lead emissions to the environment would be cut without the increase in crude oil consumption which would be necessary if no lead were used. Petrol might even be slightly cheaper.

Sex attractants confuse moths

E. A. Cameron, C. P. Schwalbe, M. Beroza, E. F. Knipling, *Science*, 183 (4128) 972 (1974). Disparlure, a synthetic sex attractant

for the gypsy moth, which causes much forest defoliation in the US, has been field tested in micro-encapsulated form. A dose of just under 9 lbs per square mile is enough so to disrupt the ambitions of this insect that there are grounds to believe that eventually this technique might well be added to the list of standard pest control methods.

Environmental pros for a plastic

Environmental Science and Technology, 8 (2) 115 (1974), reports that environmental impact studies put 'lopac', a nitrile-based plastic to be introduced by Monsanto, ahead of glass, steel and aluminium as a container material on grounds of energy consumed in manufacture, energy required to recycle and effluents produced in manufacture.

Venice sinking

G. Gambolati, P. Gatto, R. A. Freeze, *Science*, 183 (4127) 849 (1974). Since 1930, Venice has subsided about 5 inches as the result of sediment compaction caused by extensive ground-water withdrawal at the nearby industrial port of Marghera. A preliminary estimate indicates that if withdrawals are not allowed to increase further, an additional total subsidence of about an inch (3cm) is likely.

Biological cycles of toxic elements in the environment

J. M. Wood, *Science*, 183 (4129) 1049 (1974). The chemical elements are classified according to potential hazard and their environmental cycles are discussed with special reference to the cases of mercury and arsenic.

Sewage works a pollutant factory?

P. E. Gaffney, *Science*, 183 (4123) 367 (1974), writes describing how, in a case he examined recently, polychlorinated biphenyls (PCBs), widely distributed pollutant substances of industrial origin, might be generated inadvertently at a sewage works from other substances. In this case, these substances were biphenyl, present in a textile mill effluent (used as a dye carrier for synthetic fibres) and the chlorine with which the sewage works routinely treats its sewage. What other possibilities exist that chlorine treatment may generate unwanted pollutants?

Emergency sewage treatment

J. Wilson, *Nature*, 248 (5442) 501 (1974), reports that Oxfam is developing a sewage treatment system for use in emergency refugee camps. The enterprise was stimulated by experience in the Indo-Pakistan war of 1971. By excluding air for a suitable period of time, pathogens, such as the cholera vibrio, are destroyed.

Helium to the winds

W. D. Metz, *Science*, 183 (4120) 59 (1974), reports that the US Government has just scrapped its helium conservation programme on economic grounds and that a thousand million cubic feet of this important rare gas are to be vented to the air each year. Helium is a non-toxic inert gas of considerable scientific and technological interest and

potential. The world's largest reserves are in the natural gas fields of Oklahoma, Texas and Kansas.

What's doing since Stockholm?

Environmental Science and Technology, 8 (3) 214 (1974), carries a brief interview with Peter Thacher of the UN Environment Programme which includes mention of plans for a global environment monitoring system (GEMS).

Satellites spy snow and ice

G. J. Kukla, H. J. Kukla, *Science*, 183 (4126) 709 (1974). Satellite maps of snow and ice cover in the northern hemisphere show a dramatic snow and pack-ice cover increase in the last three years relative to the earlier years since 1967 when monitoring began. Thus in 1971, the mean annual snow and ice cover increased by 1.5 million square miles. Because snow cover increases the amount of solar radiation reflected back into space by our planet, such changes are not insignificant in regard to climate. The author notes that world weather patterns in 1972 and 1973 were unusual in many respects. "The potential for fast changes of climate evidently does exist on the earth and should be kept in mind."

Atmospheric effects of pollutants

P. V. Hobbs, H. Harrison, E. Robinson, *Science*, 183 (4128) 909 (1974). Pollutants which affect the sensitive atmospheric processes of cloud formation and precipitation are those most likely to produce changes in weather and climate.

Copper and eutrophication

A. J. Horne, C. R. Goldman, *Science*, 183 (4123) 367 (1974). Eutrophication control seems economically possible, in one California lake at least, through the addition of quite small quantities of copper.

Straw burning and agriculture

A. W. Howland, *Clean Air*, 4 (13) 11 (1974) describes a new agricultural device which is pulled by tractor to burn stubble while minimizing smoke pollution and fire hazard. Stubble burning helps control weeds and crop diseases.

The City of London and clean air, 1273-1973 A.D.

B. R. Masters, *Clean Air*, 4 (13) 22 (1974).

The Dona Marika oil spill

R. A. A. Blackman, J. M. Baker, J. Jelly, S. Reynard, *Marine Pollution Bulletin*, 4 (12) 181 (1973). Most documented oil spills are of crude oil. In this case, 3,000 tons of petrol were spilled in Milford Haven last August. An account of the incident and some of its effects is given. It appears that initially the petrol acts on shellfish as a narcotic and not as a lethal poison.

Destruction of the mangroves

V. Canestri, O. Ruiz, *Marine Pollution Bulletin*, 4 (12) 183 (1973). A consequence of coastal development in Venezuela is reported.

Changing Amazon climate

T. C. Emmell, *Science*, 183 (4122) 254 (1974), reports that average annual rainfall in the western Amazon basin has increased from 100in. (1961-1970) to 140in. today. This may be related to atmospheric pollution from major oil fields recently developed in Ecuador. Developing countries should take note of such phenomena.

Volcano and glacier

J. R. Bray, *Nature*, 248 (5442) 42 (1974). Historical data going back to 1500 A.D. suggest that periods of volcanic activity are followed by periods of global temperature decline, glacier advance and the likelihood of food shortage.

Halocarbons mark Los Angeles air

P. G. Simmonds, S. L. Kerrin, J. E. Lovelock, F. H. Shair, *Atmospheric Environment*, 8 (3) 209 (1974). Atmospheric halocarbons (carbon tetrachloride, trichlorofluoromethane, etc) arising from the 500 tons of dry cleaning fluid, degreasing solvent and various industrial fluids which just evaporate away every day in Los Angeles, 'mark' the local atmosphere with extremely low concentrations of these substances. As analytical techniques are extremely sensitive for this class of substance, their presence may be used to monitor movement of the Los Angeles air mass both within and away from the city. Similar techniques might be used to track the movement of urban air elsewhere.

Pollution indoors

M. Benarie, T. Menard, A. Nonat, *Atmospheric Environment*, 8 (2) 149 (1974). Measurements inside a school building in France showed that sulphur dioxide levels indoors were 71 per cent those outdoors, while smoke levels were not affected.

Schistosomiasis, a chemical key?

A. J. MacInnes, W. M. Bethel, E. M. Cornford, *Nature*, 248 (5446) 361 (1974). Studies on the chemical substances influencing the behaviour of the Schistosomiasis parasite in relation to its intermediate aquatic snail host have been undertaken. Ultimately this approach may hold the key to controlling the spread of this serious human disease.

Nuclear reactor accident in Russia?

Nature, 248 (5444) 95 (1974) reports satellite indications that a serious accident may have occurred with the Soviet fast breeder reactor at the new town of Shevchenko on the Caspian Sea.

Floating nuclear power plants

L. J. Carter, *Science*, 183 (4129) 1063 (1974). Americans debate the hazards and merits of producing floating nuclear power plants in quantity and towing them to locations around the world. They could be a fact of life by 1980.

Plutonium: biomedical aspects

W. J. Bair, R. C. Thompson, *Science*, 183 (4126) 715 (1974). Highly toxic plutonium is central to nuclear breeder reactor technology. Here is summarised much of what we know concerning the toxicity and bio-

logical effects of this element. We still do not know enough.

Economics of resource recovery from municipal solid waste

J. G. Abert, H. Alter, J. F. Bernheisel, *Science*, 183 (4129) 1052 (1974), show that recycling can pay, and how it pays.

Heavy metals in estuaries

R. Fuge, K. H. James use heavy metal uptake by brown seaweed to provide a further measure of environmental contamination in the Bristol Channel. They find zinc, nickel and cadmium highest near Portishead with a secondary high in Swansea Bay (see *Marine Pollution Bulletin*, 5 (1) 9 (1974)). B. S. Cooper, R. C. Harris find that even in the lightly polluted River Blyth in Northumberland, quite high concentrations of metals can accumulate in estuarine sediments (see *Marine Pollution Bulletin*, 5 (2) 24 (1974)). M. W. Hardisty, R. J. Huggins, S. Kartar, M. Sainsbury give lead, cadmium and zinc levels for flounder caught at Oldbury on the Severn estuary at different times of year. Values for some other species are also given. Perhaps the estuary is not so bad for its fish as some think, they suggest. (*Marine Pollution Bulletin*, 5 (1) 12 (1974)).

Oil wells and earthquakes

E. Arieh, A. M. Merzer, *Nature*, 248 (5442) 534 (1974). The flow of oil from wells in the Gulf of Suez shows great fluctuations in the months before a nearby earthquake. Is there a general phenomenon here which might be used to predict earthquakes?

Ascorbic acid (Vitamin C) against nitrosamines

J. A. Edgar, *Nature*, 248 (5444) 136 (1974). Ascorbic acid is known to react chemically with many cancer-producing (alkylating) chemicals. It might aid the body by providing some protection against cancer from such agents.

Smoking risks

The natural thiocyanate component of saliva is increased four times in smokers relative to non-smokers. Thiocyanate speeds the reactions which form carcinogenic nitrosamines from certain food components in the stomach of rodents. What does this mean for man? (E. Boyland, S. A. Walker, *Nature*, 248 (5449) 601 (1974)). Lung tissue experiments show that gases and vapours in cigarette smoke are quite as much a health hazard as the particulate, tar component on which attention tends to focus. (C. Leuchtenberger, R. Leuchtenberger, I. Zbinden, *Nature*, 248 (5442) 565 (1974)). Tobacco smoke contains relatively high concentrations of methylchrysenes. Two compounds of this class are reported to be strong tumour initiators. (D. Hoffman, W. E. Bondinell, E. L. Wynder, *Science*, 183 (4121) 215 (1974)).

Air pollution and lung cancer

H. R. Menck, J. T. Casagrande, B. E. Henderson, *Science*, 183 (4121) 210 (1974). Higher lung cancer rates are reported for men living in certain heavily industrialised areas of Los Angeles.

Lead in salt marshes

M. Banus, I. Valeila, J. M. Teal, *Marine Pollution Bulletin*, 5 (1) 6 (1974). American studies show that lead (of pollutant or natural origin) accumulates in shallow salt marsh sediments, is taken up into the grasses growing there, and much of this lead is then moved out to sea as this is the fate of much of this grass.

Polystyrene beads get around

A. W. Morris, E. I. Hamilton, *Marine Pollution Bulletin*, 5 (2) 26 (1974), report that small polystyrene beads of industrial origin are common throughout the Bristol Channel. Figures indicating geographical distribution are given.

Energy crisis not withstanding,

Laboratory News, (74) 5 (7 May 74) reports that next year the Standard Oil Co. will open a plant to produce ten million pounds of yeast (50 per cent protein) per year from petroleum as a food source.

Amino acid enriched foods

A. M. Altshul, *Nature*, 248 (5450) 643 (1974). Amino acid fortification of foods may alleviate nutritional problems by reducing demand on protein derived from the land, it is suggested. By 1980, up to 20,000 tons of lysine may be added to cereals for human consumption.

Effects of Herbicides in South Vietnam

Part A, available from the National Academy of Sciences, 2101 Constitution Avenue, NW, Washington DC 20418, USA, \$10, reviewed in *Nature*, 248 (5445) 186 (1974) by Colin Wilson.

Fluoride pollution from an aluminium plant

G. W. Israel, *Atmospheric Environment*, 8 (2) 167 (1974). Levels of fluoride in soils, plants and cattle urine have been measured around a US aluminium plant set in rural surroundings. Measurements began a year before the plant started operating to give baseline values. A particular monitoring technique for gaseous environmental fluoride was found to be valuable in assessing pollution exposure.

Toxaphene insecticide

J. A. Casida and six others, *Science*, 183 (4124) 520 (1974). Toxaphene is made by the chlorination of camphene and unlike most pesticides, is a complex mixture of at least 175 components. The authors take a preliminary look at this mixture and consider its bio-degradability.

NRDC 161, a new insecticide

M. Elliott, A. W. Farnham, N. F. Janes, P. H. Needham, D. A. Pulman, *Nature*, 248 (5450) 710 (1974). A new synthetic insecticide related in structure to the natural pyrethrins exhibits outstanding toxicity to insects. Data on mammalian toxicity are provided by J. M. Barnes, R. D. Verschoyle, *Nature*, 248 (5450) 711 (1974).

Rust as a fire hazard

R. I. Hughes, T. D. B. Morgan, R. W. Wilson, *Nature*, 248 (5450) 670 (1974). Rusty

surfaces exposed to hydrogen sulphide gas (as in gas lines, chemical plant, crude oil cargo and storage tanks) may constitute a fire hazard for industry, say three Shell scientists. "Pyrophoric" iron sulphide could form which on contact with air might provide a source of ignition for inflammable vapours. Recent minor explosions on crude oil tankers might have had such an origin.

Nutritional lessons from the Ethiopian drought

J. B. Mason, R. W. Hay, J. Holt, J. Seaman, M. R. Bowden, *Nature*, 248 (5450) 646 (1974). An assessment of 1973's Ethiopian drought and international reaction to it. For example, external agencies could have considered more closely the actual nutritional needs and also the local acceptability of the types of food sent.

Sea-floor oil field

Marine Pollution Bulletin, 5 (1) 4 (1974) reports briefly that Lockheed is planning a complete oil field with installations on the sea floor and no surface platforms.

Shrub thrives on nickel

B. C. Severne, *Nature*, 248 (5451) 807 (1974). *Hybanthus floribundus*, an Australian shrub, thrives on nickel-rich soils and concentrates the metal in its leaves to about 5000ppm. The maximum leaf nickel recorded is 1.6 per cent. The plant lives in an arid region and it is possible the nickel phenomenon is an adaptation to reduce water loss.

Reindeer pressure

Nature, 248 (5450) 639 (1974). A correspondent reviews a reindeer population problem on the remote island of South Georgia. By 1958, 11 animals released there in 1909 had become 4000 and today the whole ecology of the area is under pressure with animal densities up to one per 17 acres locally.

Methyl mercury and the nervous system

H. J. Segall, J. M. Wood, *Nature*, 248 (5447) 456 (1974), show that this toxic mercury pollutant reacts with the plasmalogens, important components of cells of the central nervous system.

Patulin, a worry for cider producers

Nutrition Reviews, 32 (2) 55 (1974) reports that Patulin, a carcinogenic fungus product, is a potential contaminant of apple juice from farms where spraying has not been used and fungus rotted apples may occur. This should concern those who advocate "organic farming", it is suggested.

Ancient climates and tree rings

V. C. LaMarche, *Science*, 183 (4129) 1043 (1974). An illuminating survey of the way an examination of tree ring patterns reveals fluctuations in climate over the past several thousand years. This knowledge should help us to assess present climatic variations.

Naples polluted

C. R. C. Sheppard, D. J. Bellamy, *Marine Pollution Bulletin*, 5 (3) 42 (1974). A rather brief survey of the extent of heavy metal pollution of the Mediterranean around Naples.



Reports

LAKE RESTORATION BY COMPRESSED AIR

*Just past the toll-house,
by the little croft
Crayfish are speared up red from
the pot,
There move Brunnsvikens
wavelets clear*

Like watered silk upon the mere.

When Swedish poet, Carl Michael Bellman wrote these lines in 1790, he could not have foreseen that Lake Brunnsviken would have been turned into a stagnant sewer by 1960.

Situated on the outskirts of Stockholm and Solna, Lake Brunnsviken suffered the fate of many of the world's inland waterways, being the outfall of both industrial and domestic wastes. In 1969 all areas around the lake were connected to purification plants, but the earlier pollution of the water had paid its toll:

Brunnsviken remained 'dead'.

Lakes may be classified into many categories, the simplest groupings being shallow and deep (8-10 metres or more in depth). The masses of water in deep lakes are divided into two distinct strata during the summer: an upper, warmer, and therefore lighter layer, the epilimnion, which has good contact with the atmosphere; and a lower, colder and heavier layer, the hypolimnion, which is isolated from the atmosphere.

In the upper layer, plankton and algae produce organic matter, with oxygen as a by-product. If the nutrient content increases because of pollution, the production of organic matter also increases. When these organisms die, they sink down into the hypolimnion where they normally decompose into oxidised sediment. For this process

to occur, oxygen is required in the hypolimnion. In polluted lakes, however, too great a load of dead organic matter sinks, and during the winter and summer stagnation periods, anaerobic (complete absence of oxygen) conditions may occur in the bottom layer.

If this happens, hydrogen sulphide begins to form, and at the same time nutrients bound in the sediment are dissolved back into the water. During the next circulation period these nutrients are again mixed back into the entire body of the lake.

The consequences are, once again, an excessive production of organic matter in the epilimnion and rapid oxygen consumption in the lower layer during the next stagnation period.

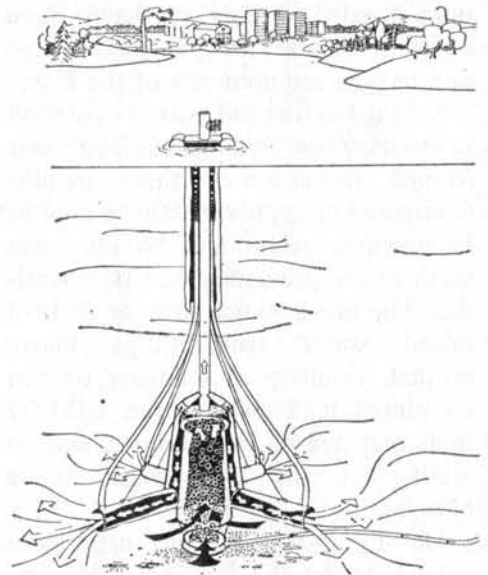
Even if the source of waste and sewage water is cut off, the lake generally has no chance of breaking out of this vicious circle of internal decay.

The most obvious way of reversing this process would be to bring the bottom layer to the top, but this simple solution has been proved to have catastrophic results! Huge algal 'blooms' form, which effectively prevent sunlight entering the water and all vegetation at the lower levels dies. Another serious consequence is a rise in temperature of the bottom layer with a subsequent rise in the sedimentary layer. This results in an overwhelming increase in oxygen consumption, sufficient to cause an oxygen deficiency throughout the lake.

Therefore, it is extremely important in deep lakes to ensure that the stratification system is not altered when attempts are made to reverse the eutrophication process.

Before any remedy can be applied, a careful analysis has to be prepared of the lake ecology, and it is this collaboration between limnologists—experts in freshwater flora and fauna—and technicians which has led to a major break through in lake restoration techniques.

In 1972, the Swedish government agreed to sponsor a project for restoring Lake Brunnsviken, and development of a suitable method was undertaken by the Limnological Institute at the University of Lund and the Central Laboratories of Atlas Copco AB., a leading company in the compressed air industry. The answer to the research problems proved to be the



LIMNO-unit principle function.

addition of oxygen to the bottom layer of the lake, without destroying the stratification, and a mechanism was constructed, termed the LIMNO, which effectively met these criteria.

The possibility of making use of the pressure at the installation depth was a decisive factor in the design of LIMNO. In practice, this means that a higher oxygen content can be established in the water than that which corresponds to the saturation point at atmospheric pressure. In addition, the equipment functions just as well in an ice-covered lake as in an open one, as only a venting valve projects above the lake surface.

In principle, the LIMNO lake restoration unit consists of an inner and an outer aeration chamber, a venting pipe and a number of outlet arms.

Anchored in the hypolimnion just above the bottom, the unit is fed with compressed air through a submerged pipeline, from a compressor situated at a convenient point on the shore. Water is sucked into the inner aeration chamber, where it is oxygenated by intensive contact with the compressed air. The oxygenated water then passes to the outer chamber and outlet pipes distribute it back into the hypolimnion. Surplus air is collected in the upper part of the unit and is released at the surface through the venting pipe. A reduction valve maintains the correct pressure in the aeration chambers.

Any bubbles of air which remain in the oxygenated water are caught in traps within the outlet pipes.

At Lake Brunnsviken, four LIMNO units are in operation, supplying 770 kg of oxygen per day, the number of

units needed in any particular case being determined by the depth shape and oxygen requirements of the lake.

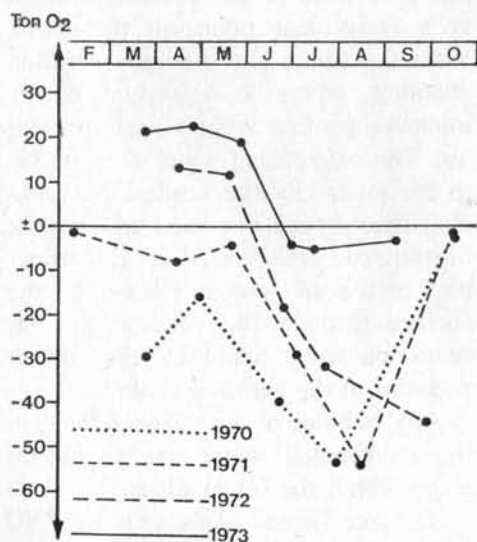
During the first full year of operation at Brunnsviken, hydrogen sulphide was formed during only three months (compared to approximately 10 months in previous years) and by only one tenth of the previously normal quantities. The fine summer weather of 1973 raised water temperatures above normal, resulting in a higher oxygen consumption. However, the LIMNO units matched all expectations, and no mixing of the two water layers occurred.

On the basis of the experience gained during the first year, two important improvements will be made to the installation. The compressor station will be supplied with a signal system to warn of breakdowns in power supply, and a technical adjustment of the aeration units will make it possible to increase their capacity by 30-40 per cent without increased air consumption. When this work is completed, the formation of hydrogen sulphide will completely cease, and it is anticipated that another four years of operation will be needed to completely revitalise the lake to its former state.

In shallow lakes, there is no negative reaction when the layers of water are mixed, and Atlas Copco recently completed an oxygenation trial in Lake Vaxjö, also in Sweden.

Compressed air was pumped into the bottom layer of the lake through a net of perforated hoses, and the general remixing of water in the lake allowed the entire mass to operate good contact, and exchange of gases, with the atmosphere.

Arthur J. Puffett.



Oxygen content below the 6m level in Lake Brunnsviken, Feb-Sept 1970-1973.

Has the time come to BAN Organo-phosphate Pesticides?

Dichlorvos, an organophosphorous compound, is now extensively used as an insecticide. Indeed it is the active ingredient of *Vapona* which is now so ubiquitous in homes, food shops, public buildings and other places where an insect-free environment is desired. Two research workers, Drs. Kenneth F. Dyer and P. J. Hanna, at the University of Monash in Australia, have been working on the genetic and more general ecological hazards of this insecticide and of the other organophosphorous compounds. Though cautious in their conclusions the scientists find the implications of continuing, and even increased, use of such insecticides—some of them persistent—extremely disturbing.

Nearly five years ago dichlorvos (Dichlorvinyl dimethyl phosphate; DDVP) was shown to produce chromosome aberrations in onion root tips, and in 1970 Löfroth demonstrated that dichlorvos alkylated calf thymus DNA in vitro. In the last few months at least four independent groups have shown that dichlorvos is mutagenic in bacteria. Each of these four reports, though, show that dichlorvos is but a weak mutagen. Ashwood Smith in Canada and Bridges in England using *E. coli*, Voogd in the Netherlands using mainly *Klebsiella* and our laboratory in Australia using *Pseudomonas* and *Salmonella*. We have also tested *Drosophila* populations which have been exposed to low doses of DDVP for some months and they have a significantly higher frequency of recessive lethal mutations than non-exposed populations. Dr. Bryn Bridges from the M.R.C. Cell Mutation Unit at Sussex looked more closely at the nature of the lesion causing the muta-



tion and found that dichlorvos gave rise to base pair substitution mutations almost entirely via an error prone DNA repair mechanism. We at Monash investigated a wide range of other organophosphates both with and without insecticidal activity, checking on their relative toxicities and mutagenic activities. We initially looked at two very simple phosphates triethylphosphate (TEP) and triemethylphosphate (TMP) and found that both these are mutagenic in *Drosophila* and bacteria, although neither are very powerful mutagens. Our finding with TMP confirms and extends Epstein's earlier suggestion (*Science* 168 p. 584, 1970) that TMP was mutagenic on the basis of his finding that it caused dominant lethal mutations in mice. Other groups are now also beginning to study both simple and complex organophosphates and are finding a number of them are mutagenic in various test systems. We at Monash have found that about 10 per cent of nearly 150 organophosphorus compounds we have screened are mutagenic when tested by the simple spot test of placing small samples of the compound in the centre of a petri dish growing a lawn of bacteria on agar. These compounds include metasystox, a systemic insecticide which has been widely used since 1950, thiometon which has been used since 1952, vamidothion introduced in 1961 and pirimifos which was first used in 1970.

Clearly these results must be borne in mind when proposing uses for various organophosphates. The important thing about TMP and TEP, for instance, is that they have very wide and important uses in the paint, plastics and chemical industries. The particular worry associated with many of the insecticides is that they are widely used on fruit and vegetables and to protect stored food products, grains, etc. The problems which many laboratories, including our own, are now working on include defining threshold levels for exposure to known mutagens and developing and agreeing on screening procedures for possible environmental mutagens. Our results with TMP and TEP highlight some of the difficulties in obtaining these objectives because they raise the possibility that a number of organophosphates might be additive in their mutagenic effects, that they may interact to produce greater than expected toxic effects or that resistance to one compound might confer resistance to others. We have therefore started population experiments with *Drosophila* in the laboratory to test some of these possibilities.

Almost from the time insecticides have been used on a larger scale in the 1940's insect populations have developed genetically based resistance to them. There are now a number of organophosphorus insecticides which in some localities are useless or nearly so against the pests for which they were originally designed, and others which have to be used at levels and frequencies considerably in excess of what was originally envisaged. Under these circumstances the potential toxic and mutagenic hazards for certain compounds might well change.

We have been able to establish a large number of *Drosophila* populations which show changed patterns of resistance to various organophosphates added to their food. Some of the more interesting results are shown in Table 1.

The mode of action of the organophosphorus insecticides is to inhibit the enzyme acetyl-cholinesterase which is essential for the effective functioning of the nervous system, although their detailed modes of action are not entirely clear and in any case vary from compound to compound and from organism to organism. Results from our experiments using these

Table 1 — Effect of some organophosphates in *Drosophila*

	<u>Normal Toxic Dose to Larvae</u>	<u>Populations now tolerate</u>	<u>Mutagenic activity</u>
TMP	0.02 M	0.06 M	Yes
TEP	0.02 M	0.13 M	Yes
TBP	0.015 M	0.12 M	No
DDVP (dichlorvos)	0.1 ppm	1 ppm	Yes
Demeton-S-Methyl (Metasystox)	10 ppm	150 ppm	Yes

resistant populations confirm the fact that resistance to one compound with anticholinesterase activity also confers some resistance to others with the same property. In particular flies from TEP resistant populations show a distinct increase in resistance to DDVP when the latter is applied as an aerosol using the standardized WHO method.

We at Monash have found that about 10 per cent of nearly 150 organophosphorus compounds we have screened are mutagenic.

We have, then, a situation in which genetically determined mechanisms of resistance to simple relatively wide spread mutagenic chemicals appear to be able to confer a measure of resistance to a considerably more toxic but also mutagenic insecticide. This toxic chemical is one about which there is considerable controversy at the present time regarding its possible hazards to man. Is this situation any indication of possible environmental hazards in this field? Some recent results suggest that it might be.

Although many of the organophosphorus insecticides are highly toxic to man and other animals, one of their advantages has always been stated to be that they are degraded rapidly and

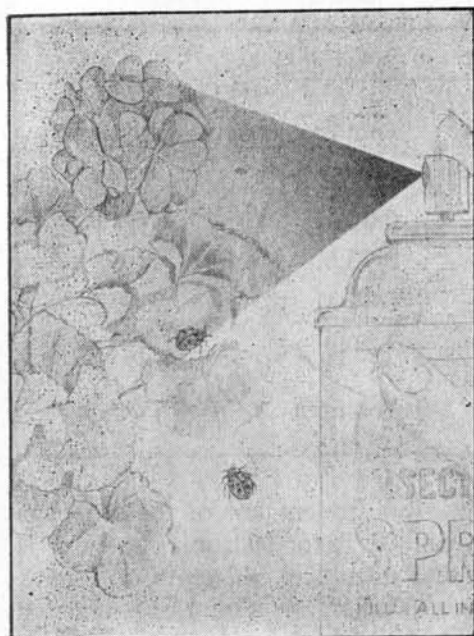
therefore present few of the problems which DDT, for instance, confer. It is rather disturbing, therefore, to read a recent report by Greve, Freudenthal and Wit (*Science of the Total Environment* 1, 253, 1972) that cholinesterase inhibitors have been found in significant concentrations in Dutch surface waters. In the Rhine and its tributaries, for instance, values up to 4.4 and 5.8 p.p.b. paraoxon equivalents were recorded in 1970. In the Maas and its tributaries values of about 0.1 p.p.b. with occasional readings of 0.4 and 0.5 p.p.b. were recorded. Some of their survey points were at drinking water sources and it is disturbing to read that even the treatment of the water for drinking purposes by no means eliminates all the cholinesterase inhibitors.

A number of different cholinesterase inhibitors were detected including parathion and malathion and similar reports of cholinesterase inhibitors in Italian surface waters in 1969 and 1971 of between 0.14—2.81 p.p.b. parathion equivalents, suggest that this may be an extensive phenomenon.

Other reports of the persistence of parathion are beginning to appear in the literature. In Nova Scotia, for instance, a survey of some fields treated with parathion at a level of 176 kg/ha between 1949 and 1953 shows that the level 16 years later is still 0.20 kg/ha. Even more significant is the finding that although most of the parathion

Table 2

<u>Treatment</u>	<u>Elimination of cholinesterase inhibitor</u>	
Rapid filtration	—	Av. 0%
Slow sand filtration	5-50%	Av. 30%
Infiltration	30-50%	Av. 45%
Fe(OH) ₃ flocculation	30-90%	Av. 60%



applied to plants is washed off or decays, a small proportion can be absorbed and translocated. In the vine, for example, intact molecules of parathion have been found in some of the tissues many months after application. Further investigations are clearly required in this area.

But perhaps, more important, some of the new organophosphorus insecticides have been specifically developed with much increased stability. Dursban, for instance, manufactured by the Dow Chemical Co., is registered for use against mosquitoes in California at a level of 0.05 lb/acre (=0.56 kg/ha) and has been tested at 0.1–0.2 lb/acre for control of chironomid midges. In 1969 it comprised 2½ per cent of the approximately 320,000 lbs. of insecticide applied for mosquito control in California. Much of its value as an insecticide stems from the fact that it is much more resistant to hydrolysis and oxidation and microbial degradation than are most organophosphorus insecticides.

It is experimental results and survey information such as those we have described which we must bear in mind when considering the toxic and mutagenic hazards to man of dichlorvos and compounds like it. The chain of information linking hazards from bacteria to possible dangers to man is certainly a long one. However, we have mentioned our comparative mutagenic and toxicity studies with bacteria and *Drosophila* and mentioned Epstein's demonstration of mutagenicity to TMP in mice. We have also shown that TMP is an infertility agent in *Drosophila* and it is known to

have similar effects in the mouse. We note that Y. P. Sun in *The Journal of Economic Entomology*, 1972, has shown correlation to toxicities for a whole range of gardona analogues in the housefly *Musca domestica* and in the mouse *Mus musculus*. The situation, to say the least, is one where considerable caution is required. We remember too that a compound such as malathion, once thought to be relatively safe for man, has in fact caused human fatalities when those exposed had been exposed beforehand to low and apparently harmless doses of parathion or other highly toxic organophosphorus compounds.

We return, then, to the problem of dichlorvos and what to recommend with regard to its use in pest strips and elsewhere. *It is disturbing too read that far from its use being restricted, new uses are in fact being suggested.* One of its most important uses has always been for killing different stages of various species of insects infesting stored products—grains in particular. On the basis of recent experimental work it is now suggested as an inhibitor of aflatoxin biosynthesis by fungi in

We remember too that a compound such as malathion, once thought to be relatively safe for man, has in fact caused human fatalities when those exposed had been exposed beforehand to low and apparently harmless doses of parathion or other highly toxic organophosphorus compounds.

stored food products. Perhaps the most important thing is that the concentration needed for aflatoxin inhibition is four times that required for the prevention of insect infestation. Pirimifosmethyl, another compound we have found to be mutagenic in bacteria, is also now suggested as a compound useful for protecting stored foods and grains.

Of course no simple answer can be given to the question in the title of this article. We know enough though, to proceed with great caution in extending the current usage of dichlorvos and other organophosphates and to say that further laboratory work of the type already started is most certainly justified.

K. F. Dyer
P. V. Hanna





Books

From philosophy to propaganda

AT THE FOOT OF THE TREE by Rolf Edberg. Univ. of Alabama Press, \$6.75. **THE CONCEPT OF NATURE IN MARX** by Alfred Schmidt. NLB, £3.25. **PROPAGANDA: THE FORMATION OF MEN'S ATTITUDES** by Jacques Ellul. Wildwood House, 90p.

Rolf Edberg's earlier book, *On the Shred of a Cloud* is said to have so inspired the Swedish delegation to the UN that they pressed for what was to become the Stockholm Conference. Mr Edberg is an eco-philosopher and he returns to the theme in *At the Foot of the Tree*. It may not have inspired any conferences, but according to its American publisher it has won more prizes than any other book in Swedish literature. Mr Edberg is searching, deep in our cultural history, to discover man's true nature and the source of his present malaise. He suggests that the environmental changes that compelled man-like apes to leave the safety of their arboreal habitat and seek food and shelter in more open surroundings stimulated their development into ape-like men. At the same time it provided them with the curiosity, restlessness and need to experiment and explore that have characterised them ever since. In a sense, the neolithic and industrial revolutions were probable outcomes of a progression that began long before man, as such, existed at all. We must be careful about using the term *Homo sapiens*, since Mr Edberg argues that we have not earned the title and conferred it on ourselves arrogantly. Who are we, then? We are still the men of the trees, and trees still

arouse strange feelings of love, awe and fear in us.

It is all rather beautiful, and rather beautifully written, but it does leave us in the air a little. No doubt we should strive to become "sapiens", but we are offered no strategies to guide our future development, only a run-down of the familiar list of acts of ecological barbarism, exhortations to mend our ways and be true to ourselves, and the suggestion that, after all, we may be saved by the radical views of our children.

The view is poetical and romantic, but the book is easy to read. Dr Schmidt is not. He is logical, meticulous and academic and his book is based on his doctoral dissertation. It is very thoroughly referenced and draws on sources not available in the English language. Its interest lies partly in its comparison of the attitudes of Marx to those of Engels and his other contemporaries.

For Marx, nature must be mediated by human activity, when it acquires great significance. In his own words, from a speech made in 1856, "At the same pace that mankind masters nature, man seems to become enslaved to other men or his own infamy. Even the pure light of science seems unable to shine but on a dark background of ignorance. All our invention and progress seem to result in endowing material forces with intellectual life, and in stultifying human life into a material force". The solution lies in the progressive domination of nature by man, accompanied by his own re-integration into it. Man will continue to exploit nature, but in a more rational way. When Marx writes of the "slumbering potentialities" of nature, he means the possibilities of further economic exploitation. Man's present situation may suggest that the transformation Marx envisaged has been parodied and that the resolution of the dialectic between subject (man) and object (nature) may be their mutual annihilation, rather than their reconciliation.

Marx is not necessarily to blame, for he was more flexible in his views than his followers. Dr Schmidt points out that his theories have been grossly distorted, especially in the Soviet Union since the time of Lenin. Marx did not believe that the truth of an ideology consists in its effectiveness in perpetuating domination, and modern

"Marxism" is based on a very narrow interpretation of the theory and a suspicion of free thought that would have been anathema to Marx himself.

This is a major critical study and rewards careful reading by shedding much light on the attitudes, and accepted truths, of the political thinkers of the 19th century.

Marx would not have liked propaganda. Neither would Mr Edberg, come to that. Contrary to popular mythology, the successful propagandist does not use lies. It selects truth, angles it, distorts it just a little and allows the public access to just as much as it will accept and just as much as will ensure its continued support for those in power. Intellectuals are more vulnerable to propaganda than are less well-educated sections of society, because they are over-confident of their ability to recognise propaganda and to reject it. Mr Ellul produces several instances of highly respectable academic scientists giving their support to political campaigns on the basis of "evidence" that consisted of no verifiable fact. Many of Mr Ellul's conclusions, advanced with a formidable logic, are disturbing, not least that no modern democracy can afford not to engage in propaganda, but that when it does so it may become indistinguishable from the totalitarian powers it opposes. The book should be read by anyone who has ever entertained the shadow of a doubt about the intellectual honesty of politicians or advertisers. I am surprised they haven't banned it!

Michael Allaby

Enough for all

POST-SCARCITY ANARCHISM by Murray Bookchin, Wildwood House, £2.95

Over a period of ten years Murray Bookchin has written a number of essays outlining the principles behind his brand of anarchism, and *Post-Scarcity Anarchism* is a selection from these works. Although I'm not sure I like his lapses into the vernacular "All the old crap of the thirties is coming back again—the shit about the 'class line'..." for example, his writing is generally lucid yet evocative and I found myself swept effortlessly along with the flow of his words and ideas.



I AM AGAINST EVERYTHING

He is in fact a superb writer and a man of deep philosophical and psycho-analytical insights, as is demonstrated very clearly by his concluding essay "Desire and Need".

Moreover in true anarchist tradition Bookchin knows the link between ecology and how man should live. "It cannot be emphasised too strongly, that the anarchist concepts of a balanced community, a face-to-face democracy, a humanistic technology and a decentralised society—these rich libertarian concepts—are not only desirable, they are also necessary. They belong not only to the great visions of man's future, they now constitute the pre-conditions for human survival," he says, and elsewhere he points out that to achieve the anarchist state we need to eliminate "the money economy, the state power, the credit system, the paper work and the police work required to hold society in an enforced state of want, insecurity and domination..." On the whole I couldn't agree with him more.

Bookchin makes it clear that he wants technology and in particular the cybernetic revolution to serve man both in achieving and in sustaining the anarchist state. Indeed, it is along these lines that he develops the theme of "Post-Scarcity Anarchism", for as he sees it, "want" will be banished once man has severed his connection with centralised authority, the state, the multinationals, for then the war machine will have been dismantled and the production of waste curtailed to an absolute minimum. Man too by then will have learnt what his needs really are; in essence nothing more or less than living in mutual co-operation with his fellow beings and his environment and being able to fulfil as complete an existence as possible.

It is clear that Bookchin dislikes toil, and in his anarchist dream he perceives

all drudgery vanishing as the machine, truly the servant of man, takes over the chores, and leaves the man the pleasant task of adding the creative touches—the master craftsman who chips out the gargoyles to embellish the otherwise monotonous stonework of the cathedral. "In a future revolution, the most pressing task of technology will be to produce a surfeit of goods with a minimum of toil," he says.

There is a terrible, irresolvable snag in Bookchin's dream and he himself is apparently afraid of it. It concerns what he terms "the fracture that separates living men from dead machines" and which could still exist in a liberated society. "All but hidden from society, the machines would work for man. Free communities would stand at the end of a cybernated assembly line with baskets to cart the goods home. Industry like the autonomic nervous system would work on its own, subject to the repairs that our own bodies require in occasional bouts of illness. The fracture separating man from machine would not be healed. It would simply be ignored."

Bookchin has given himself a let-out, for he claims that "a liberated society will not want to negate technology precisely because it is liberated and can strike a balance". Yet what could sound more like Hermann Kahn and the established technocratic society of today than Bookchin's vision of the desert covered with solar collectors, of tidal dams, of cybernetically controlled agriculture and even of controlled thermonuclear reactions. The only difference is that Bookchin sees all this technology under man's control purely because man's needs are under control, while Kahn sees the same technology contributing to the burgeoning materialistic affluence of society—the

nuclear family with its cars, boats, small aeroplane, computerised kitchen and wholly sterile home environment.

Perhaps Bookchin himself has become too urbanised to understand that toil, instead of being "thankless, repetitive and boring" can, under the right social circumstances—and I am sure I agree with him on what those are—become the very essence of creativity. A gardener derives satisfaction from digging and hoeing because he knows what rewards await him if he has done his job well while the stonemason who has to chip away at countless stones derives his pleasure from seeing what grandeur can result.

Undoubtedly where Bookchin scores is when he enters the political arena and brings to life the essential differences between anarchist thought and that of latter-day Marxists. Moreover, being an anarchist he is not tied to dogma and slogans and can therefore let his mind develop themes, even fantasies without fear of expulsion from some rigid, highly authoritarian unindividualistic organisation. Indeed while being absolutely revolutionary himself, he is free to denounce Marxists for having destroyed the true revolution at all times from the Bolshevik uprising to the Spanish Civil War and in the 1968 May-June uprising in France.

Convinced Marxists and Capitalists are not going to agree with Bookchin, nor necessarily like his book. For Anarchists and people with free minds he has given a lot to think about. The burning question for myself is whether modern technology with the emphasis on automation can ever lead man to a truly revolutionary state or whether it will always have the edge, thereby enslaving him until it has destroyed him.

Peter Bunyard

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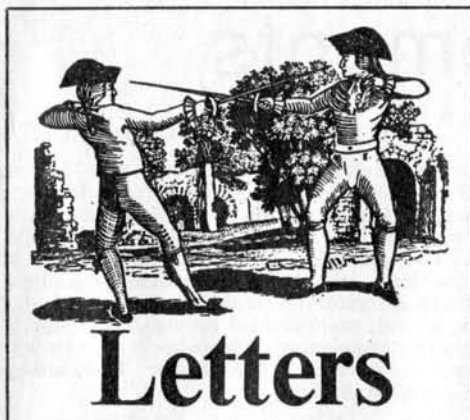
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Strong words

Sir,

Mr Edward Goldsmith, in his article in your April issue, strongly attacks Lord Zuckerman, Mr Crosland and others for daring to suggest that the problem of pollution can be dealt with by means of technology. Mr Goldsmith thinks that technology has nothing to offer and goes so far as to claim that "it is dangerously irresponsible to suggest that it is remotely conceivable to have a clean environment in any other way but by reducing man's impact on it, which must mean proceeding with the systematic de-industrialisation and de-centralisation of our Society". Strong words indeed!

But I would be happier if Mr Goldsmith would tell us a little more of his proposed remedy at an early date because, *prima facie*, it seems complete nonsense. De-industrialisation must mean doing away with industrialisation wholly or partly but I imagine Mr Goldsmith cannot mean wholly and, similarly, de-centralisation must mean removal of population or industries or both from a large conurbation to a smaller one or to a new small one. Again, not wholly but partly but how partly in either case?

So far, his article is just a nice piece of well written prose which conveys absolutely nothing except abuse for the people he mentions. He tells us nothing of his ideas for de-industrialisation and de-centralisation. He gives no indication of which large towns he would like to reduce in size and where he would like to put the people and other business premises he would like to remove to other districts. Nor does he tell us to what extent he thinks the populations of, say, London, Birmingham, Glasgow, Liverpool, Manchester, Leeds, Sheffield, Bristol and so on

should be reduced and what is to happen to the premises they used to occupy, and how they are to get employment in their places of abode. Nor does he tell us anything about the cost of such an operation and to whom and how many years it would take to achieve or about the new provision for disposing of sewage etc. in the new or enlarged districts.

All he does is to give us a catchphrase of two magic words. I think the readers of your journal are entitled to something rather better than Mr Goldsmith has given us, especially as he is not someone merely interested in environmental problems but a professional ecologist.

Yours faithfully,
I. H. Benjamin,
17 Ashley Court,
Hove.

I have tried to show in a series of articles—see those on Homelessness, Ignorance, Unemployment and War in recent issues of the *ECOLOGIST*—that technology can solve *technological* problems, but not biological, social or ecological ones. These require biological, social and ecological solutions. The constructive programme of change you ask for will appear shortly.

Editor

When 'Nature' was the Enemy

Sir,

David Black rightly says we should 'try to understand' how Christians came to mis-interpret so grossly the real Christian vision of man's relation to the rest of creation.

It helps if we remember that such false ideas crystallised as "Christian" during the Middle Ages, when "nature" still seemed to most people an enemy to be fought. There were exceptions among saints and artists, but ordinary people did not find the countryside beautiful or inspiring. That was a later, romantic, notion. It seemed, rather, savage and dangerous to the still comparatively few human beings. It was the man-made *city* which symbolised hopes of peace, order and beauty, man's defence against the threat of surrounding wildness—of weather, forests, animals. It is not surprising if the idea of being a "Lord of Creation" was a comforting one to the people who felt, in practice, puny and helpless before the sheer size and ferocity of natural forces.

The balance has shifted and perhaps

one side of us still wants revenge for that experience of humiliating fear. (Children still have such fears.) But we could learn something from our ancestors about the proper human significance of the city!

Yours faithfully,
Rosemary Haughton,
Oswaldkirk,
York.

Socialism and Environment

Sir,

It was with deep regret that I read the most extraordinary statement, 'No ideology could be less compatible with the aims of ecologists and environmentalists than socialism', which concluded a letter from F. C. Nano in your April edition. Somebody's terminology is at fault and if it is mine I fear I must cease to call myself an environmentalist.

It is a sad fact that ecologists are chiefly made up from that class of society that has most benefited from (and subsequently attached greatest value to) the better parts of our environment whereas socialists are to be found in their strongest numbers in the class of society which has benefited least from the Industrial Revolution. However, it would be wrong to infer that their respective philosophies are intrinsically different either in aims or in means of execution. Mr. Nano appears to be guilty of a mild attraction towards social elitism which could hardly be associated with most readers of *The Ecologist*.

The socialist idea is broadly based on the trite but powerful belief: from each according to his ability to each according to his need. Most people arrive at socialist ideals from a direct commitment to improve their environment. Concern for the preservation and maintenance of a healthy biosphere should not be divorced from attempts to form a healthy society. Without either, an expression of anxiety for the future of the human race rings hollow.

Andrew Holton,
Bedford College,
London, N.W.1.

I think it is important to stop thinking in terms of socialism v. capitalism, these are outdated ideologies and the behaviour they both give rise to is equally unadaptive.

Editor

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SOCIETIES

DOES YOUR PROJECT NEED MONEY? If it's unusual, imaginative, alternative or revolutionary apply to "CLAP", Community Levy for Alternative Projects, c/o BIT, 146 Great Western Road, London W11. (Telephone 01-229 8219).

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THE DESIGN COUNCIL in conjunction with the British Tourist Authority is holding a competition to encourage publishers, authors, designers, printers, local authorities and other interested parties to produce well designed and interesting guide books. This competition is being organised as part of the British contribution to European Architectural Heritage Year 1975. The sponsors, who recognise the need to preserve our heritage for the general public to enjoy, realise that the presentation of the information that guide books offer on our architectural history contributes both to our appreciation of the past and our concern for the design of our present environment. For the purpose of this competition a guide book is defined as a book, leaflet, folder or other publication printed in Britain, that gives guidance and information about the architecture, history and amenities of counties, cities, towns, villages and places of interest in the UK. The closing date for submissions is 17th January 1975. Further details and entry forms from Peter Smith, The Design Council, 28 Haymarket, London SW1Y 4SU.

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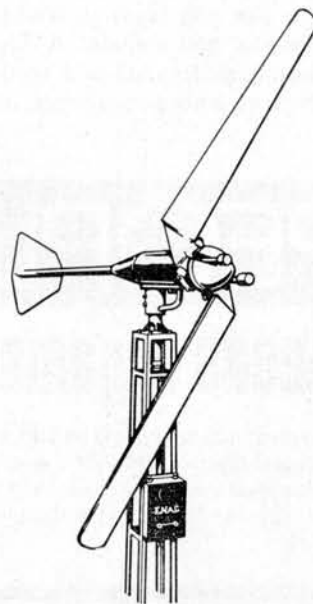
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