

The New Ecologist

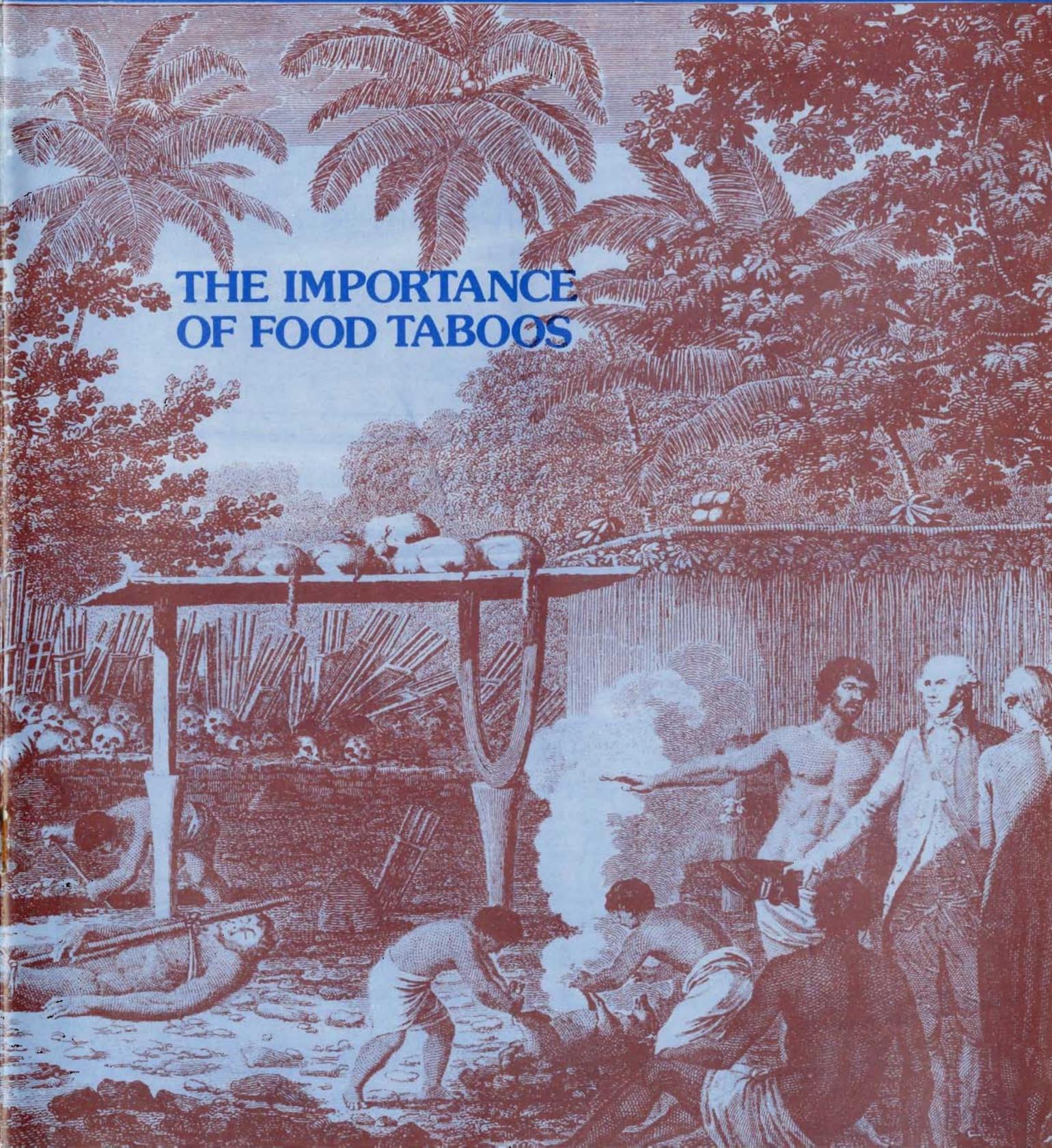
Journal of the Post Industrial Age

No.5

Sept~Oct 1978 60p

Mellanby versus theory and fact · Poisoned Meat · Low Dose Radiation

THE IMPORTANCE OF FOOD TABOOS



**SOUTH PLACE ETHICAL SOCIETY
AND THE ECOLOGIST —
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**ETHNIC DIFFERENCES
IGNORE OR ACCOMMODATE?**

Sunday November 5th 1978

at Conway Hall, Red Lion Square, London WC1

Morning Session 11 am — 1 pm

Ethnic Differences Ignore or Accommodate?

Chairman:

Peter Cadogan

Speakers:

Edward Goldsmith

Nicholas Hildyard

Followed by Discussion.

Afternoon Session 2.30 pm — 4.30 pm.

Ethnic Differences in Africa.

Speakers:

Jimoh Omo Fadaka

Alan Mezgebe

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Cover: A human sacrifice in Tahiti from *The Voyages of Captain Cook*. (Design by Mike Frost)

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 Associate Editors: Robert Allen, Michael Allaby, Peter Bunyard, Brian Johnson, Jimo Omo-Fadaka, Andrew MacKillop, Robert Waller, Lawrence Hills, John Papworth, Nicholas Gould, Raymond Dasmann, Richard Willson, John Milton (USA), Henryk Skolimowski (USA), Manfred Siebker, Sigmund Kvaløy (Norway), Bernard Gilbert.

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Self-sufficiency is not enough

The overriding political goal of all concerned for the future of the world must be the creation of an ecological and social balance in which human beings may live in harmony with nature and at peace with themselves. In such a society all citizens will be creatively involved in achieving a high level of self-sufficiency and self-reliance — conditions that are not, as is sometimes claimed, tools towards an end, but are themselves basic to the structure of a balanced society.

It is useful to clarify the differences between these two concepts. By self-reliance we mean a quality that must be cultivated at all levels of society. It includes the ability of a social unit to continue its existence in the face of change and in adverse conditions. It means resourcefulness, readiness to change, the potential to adapt to a given set of circumstances. It is not something that can be observed, still less quantified, for it can only be described in qualitative terms.

Self-sufficiency, on the other hand, *is* quantitative. It means the degree to which a particular social unit has access, within its own territory and at any time, to the materials, energy, tools and food required to sustain its own population.

If an administrative unit produces a sufficient quantity of food and raw materials to supply its own population, together with the necessary machinery for processing these resources, it may be termed 'self-sufficient' in all vital areas, but unless the people living in this unit are also able to adapt to change in diet or work, unless they can mend their machinery when it breaks down, unless they are prepared to make do with alternatives or in some cases to go without some commodity they have had hitherto, this society cannot be described as self-reliant. Thus we can have a situation in which a nation may be one hundred per cent self-sufficient within its own frontiers, while its quality of self-reliance is disastrously poor.

In a nation where the majority of the people are specialists whose work is dependent upon materials and machinery over which they have no control; where the production of vital consumer goods is confined to a few major manufacturing areas; where electricity and other sources of power, on which industry, transport, services and the domestic consumer all rely, are transmitted from highly complex technological centres;

where vital economic and social information is stored in data banks and is retrievable only through computerised electronic networks and where, finally, the economy is geared to an international economic system, any breakdown in the organisation will inevitably result in total chaos.

Now let us suppose that the Euro/American economic structure breaks down. The export and import-based industries of our hypothetical country grind to a halt. Half or more of the working population lose their jobs; the economic base for social relief fades away, so does the base for keeping road, air and sea-going traffic running. The large computers and data banks are unable to supply vital information because the expertise required to operate them is missing; banks cannot fulfil their function because their largest customers have gone bankrupt. Government employees and civil servants lack the knowledge, infrastructure and physical means to deal with the new situation. Soon they, and a host of other groups of citizens, particularly urban dwellers, are without vital services and food rapidly becomes scarce.

In this situation it will not be much help to the citizens that there exist in their country sufficient quantities of mineral resources, electric energy, farmland, modern factories, agricultural machinery and so on, because they will be unable to benefit from them. The nation will suffer a severe crisis in production and distribution of vital goods. There will be a breakdown in services and the country will be thrown headlong into a period of acute social and political chaos, probably leading to the establishment of some sort of dictatorial regime. If the nation is also one in which the dynamic of social and economic life is based on competition the citizens will be further handicapped by having no tradition of loyal co-operation — a quality that will be much needed in this new situation.

To avoid a scenario of this kind self-reliance must have been built up and built-in at all social levels *before* the breakdown occurs. From the national level right down through the district and community levels to the group and the individual. Resourcefulness, courage, loyalty and the ability to contribute his total energy for the good of the community, these are the qualities that will be needed in the citizens of a truly self-reliant society. How these can be made to flower in modern societies is the greatest problem we are faced with today. It is inevitable that in a modern welfare state the opportunities to learn and practise these virtues are woefully lacking. Age-long experience suggests too, that once they are withered these qualities are not quickly or easily recreated, and that the main catalyst for their revival is necessity.

Sigmund Kvaløy

The author, who teaches at the Oslo School of Architecture, is Norway's leading environmentalist; he is a member of Ecoropa and an Associate Editor of *The New Ecologist*.

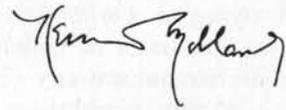
Mellanby versus Theory & Fact

Dear Edward Goldsmith,

You ask me (*New Ecologist* May 1978 p.77) "what, in fact, makes Kenny run?" I can answer you in two words - The Truth. I have looked at the available evidence regarding fertilisers, energy and agriculture, pesticides, hedgerows and other subjects. In some cases I have done research on these problems myself, in some I have directed the research of colleagues. As any research worker would expect, the results have not always been those expected, or those which support many dearly-held beliefs. My views have always been based on my sincere judgement of the evidence available. Often the situation has been found to be very complicated, when I have tried to give all sides - what you call "a Mass of Contradictions". I do not believe in any dogmas, even in what are called "basic ecological principles" when these are not

supported by facts. I do not try to believe three impossible things before breakfast. I commend you for your faith - I even expect you to believe that "diversity produces stability" and not to be discouraged when observations sometimes show that it does not.

Incidentally I have never before, to my knowledge, been called "Kenny". I do not like this form of address, preferring my name to be used in full.



Kenneth Mellanby

Edward Goldsmith replies:

I must thank you for taking the trouble to answer my criticisms, nevertheless more criticisms must follow for I do not find your arguments at all convincing.

You say that you have done research yourself and directed further research on the subject of energy and agriculture, pesticides, hedgerows etc. and that the results have been unexpected, and, by implication not in keeping with what one would have expected on the basis of what you call 'dogmas' and I refer to as 'basic ecological principles'.

First of all, I am not at all sure that it is by means of 'research', as it is currently understood, that the accuracy of many of your statements can be verified. What sort of research, for instance, is going to tell you that the Australians should not set aside large areas of wilderness unless, as you told them 'they have first established that there is a demand for it'? This statement merely expresses your belief in the virtues of the market economy to which you imply, any ecological considerations should be subordinated - a belief that no amount of scientific research is likely to dispel. What sort of research can justify your view that burning straw and spraying paraquat over our crops are justified because they save labour? Again these statements surely reflect your belief that our energy-intensive agricultural system is here to stay, a belief that cannot be confirmed or invalidated by conducting scientific research in a laboratory. It must be examined by considering energy-intensive agriculture in the light of a holistic model of the biosphere, and this would un-

doubtedly reveal that few of the conditions required to sustain this type of agriculture are likely to obtain in the next decades. With regard to the other statements that I have criticized, research carried out by you that might appear to confirm their validity can be presumed to be wrong, because they conflict:-

- a) with the basic ecological principles that you refer to as 'dogmas'
- b) with all the mutually consistent empirical evidence that has been acquired over the last few decades on these subjects and which confirm the validity of these principles.

Let us first consider this notion of basic ecological principles which you refer to as 'dogmas'.* Are basic physical laws dogmas too? Is the law of gravity a dogma? Is the second law of thermo-dynamics a dogma? Do you suggest that we should not have any laws and that every situation should be judged entirely on its own merits? This would certainly create a paradise for scientists. Think of all the experiments that would be required if each one were only regarded as providing information on the specific white mouse it was carried out on, rather than on all white mice and perhaps even on other mammals such as man. Yet this is what you are suggesting. As knowledge builds up and we learn how things work, it becomes possible to predict behaviour without having to carry out so many

*NOTE: I shall deal with the relativity between diversity and stability separately in *The Ecologist Quarterly*.

experiments and observations. If you put an earthworm in a maze it will take a long time to find its way out, a rat will get out more quickly, a man quicker still. The reason is that as we move from simple to more complex forms of life, learning ability increases and fewer experiments are required for finding out how things work. In fact one can formulate a basic principle or 'dogma' to the effect that the number of observations required to understand how something works is inversely proportionate to one's knowledge of it. Otherwise there would be no reason for acquiring any knowledge. This knowledge, like all information used in nature, is organised hierarchically to constitute a model on the basis of which responses are mediated and monitored. A model is of necessity hierarchically organised being made up of basic principles that are differentiated into less and less basic ones, dealing with increasingly less general and more specific things. The most basic principles tend to be treated as 'a prioris'. A primitive tribe for instance will not question the basic principles underlying its world view which provides it with a model on the basis of which its behaviour is mediated. We do not behave any differently, and the basic principles of the world-view of industrialism, which has been swallowed hook, line and sinker by most of our scientists, are also regarded by us as *a prioris* — that all considerations must be subordinated to economic ones for instance. Epistemologically speaking, no basic principles, not even the law of gravity nor the second law of thermo dynamics are *a prioris*. Each is simply the best hypothesis that we can formulate for explaining important observable patterns on this planet. A hypothesis can of course be wrong. Without being wrong, a hypothesis can sometimes be advantageously replaced by another that takes into account certain factors that the previous one did not. In this way Newton's physics were replaced by Einstein's. Nevertheless if a single piece of research yields a result that is not in accord with basic principles that have been found to hold good over a long period of time, it *must be regarded as exceedingly likely to be wrong*. All the more likely as observations, even in controlled laboratory conditions, are notoriously unreliable. First of all, as Heraclitus said 'You cannot step into the same river twice', the reason being that it is always changing. So too are the white mice that you study in your laboratory and the conditions in which you examine them. No two experiments can ever be carried out in identical conditions. Nor do experiments on things carried out in isolation from other things provide very much knowledge about the real world, *because things in the real world do not occur in isolation*.

That is why the possibility of Minamata disease was not predicted. It was not then known that organic mercury would be changed, by the marine ecosystem, into the terribly toxic dy-methyl mercury, because this did not happen in test tubes. The things that you study in your laboratory do not in fact exist outside laboratories any more than do phoenixes and unicorns. This is one of the basic lessons of ecology. The biosphere is an organisation and as such is not just made up of the sum of its parts. How these parts are organised is equally important and this your laboratory

research will never tell you, because *it is designed precisely so as to isolate the thing you are studying from all other things with which they are normally interrelated and which are wrongly regarded as irrelevant for the purposes of the study*.

What is more scientists often make mistakes. *Que Choisir?*, the French consumerist magazine recently provided thirty-two laboratories with a specimen of human faeces, into which they had introduced various micro-organisms of a kind that are commonly found in human faeces. Thirty-one of the laboratories failed to identify them and provided totally false analyses.

Scientists also cheat, as was revealed by a series of articles published last year by the New Scientist. Even if they do not falsify the results of experiments, these are often set up in such a way that they will yield the desired results. It was in this way that Dr Dolphin attempted to demonstrate that workers at Windscale had a lower cancer rate than anyone else in the country, in defiance of known principles of cancer induction by low levels of radiation. What he did was conveniently avoid including in his study workers who had left Windscale to work elsewhere, who had retired or who had died, (possibly of radiation-induced cancer). The same was true of the famous experiments invariably quoted by Shell Chemicals to demonstrate the harmlessness of DDT. I shall quote Wurster on this subject.

'Several studies of the physiological effects of DDT, Aldrin, Dieldrin and Endrin, have involved human subjects (Jager, 1970; Hayes et al., 1971). These studies were deficient in experimental design, failed to consider the most relevant parameters, and were more concerned with levels of CH storage than with physiological or biochemical effects. They establish only that under current environmental conditions, excluding accidents and suicides, members of the general population are not dying of acute CH insecticide poisoning, nor are they suffering overt, toxic symptoms. Long-term, chronic effects were inadequately studied.

'To be more specific, the investigations by Hayes et al. (1971) and those conducted in the Shell laboratories (Jager, 1970) had only men in their samples, women, children, infants and foetuses, were not studied. The small numbers of men involved were completely inadequate to evaluate biological events (such as carcinogenesis or mutagenesis) that may occur once in many thousands of individuals. Periods of exposure were too short to detect biological effects involving induction periods that may be many years or decades. Emphasis was given to reviewing the men's attendance records at work, and many of the other simple blood and other routine tests performed were largely irrelevant. When two of twenty-two men who were being fed high dosages of DDT became severely ill after months on this diet, they were dropped from the experiment and excluded from the data with the conclusion that "at no time was there any objective finding to indicate a relationship between illness and DDT storage" Hayes et al., 1971).

'It is unlikely that these tests on men could have detected behavioural changes, hepatic enzyme induction, carcinogenesis, mutagenesis, or other effects that might be anticipated in man because they



One Man Crusade Against Dogmasaurus Rex

occurred in experiments with laboratory animals. The authors concluded, nevertheless, that exposure to these CH insecticides involved no ill-effects on human health — a conclusion that has been widely quoted by the pesticide industry. It seems remarkable that, although hundreds of millions of people have been exposed to these substances for more than two decades, their effects have been so inadequately tested by such primitive studies on such a small number of men!

The fact is that observation and measurements that conflict with our knowledge of a particular subject are usually wrong as our everyday behaviour should make clear. If you put a stick into the petrol tank of your car and it reveals it to be empty and you then get into your car and drive off quite happily for a couple of hundred miles or so, do you assume that your car has learnt to function without petrol? Of course not, you know damned well that the measurement you made was wrong. In just the same way if you meet a man who tells you that he has built a perpetual motion machine, you know that he is either lying or that he has failed to identify some external form of energy which is in fact responsible for the motion in question. In the same way, if a BNFL scientist tells you that the cancer rate is lower at Windscale than anywhere else, and if scientists working for Shell Chemicals tell you that they have carried out experiments that have proved that DDT has no ill effects you know that they have either made a mistake or their experiments have been wrongly carried out. The same must be true of your particular research and that of your assistants. If it proves that modern agricultural practices do not cause erosion; that one does not encounter diminishing returns on fertilizers; that soil treated with paraquat is an ideal habitat for wildlife; that hedges are of no ecological value; that low levels of pesticides are harmless; that we should go on using DDT and that millions of people in the Third World will die of malaria if we do not; and that growing exotic trees and clear-felling them at regular intervals is good conservation practice, then

there must clearly be something wrong with it. To prove it right, you would have to reconcile your findings with the following recent theoretical and empirical material.

Why DDT must be bad

There are good, in fact unanswerable theoretical reasons why highly biologically active synthetic substances such as DDT should not be introduced into our environment. Consider that it has taken several thousand million years of evolution for the biosphere or world of living things, of which we are an integral part, to take on the shape that industrial man found it in, and thereby provide an ideal habitat for man and the myriads of other forms of life that compose it.

During the course of this evolution, as Commoner puts it:

'The chemical, physical and biological properties of the earth's surface gradually achieved a state of dynamic equilibrium, characterised by processes which link together the living and non-living constituents of the environment. Thus were formed the great elementary cycles which govern the movement of carbon, oxygen and nitrogen in the environment, each cycle being elaborately branched to form an intricate fabric of ecological interactions. In this dynamic balance, the chemical capabilities of living things are crucial, for they provide the driving force for the ecological cycles; it is the chemistry of photosynthesis in green plants, for example, which converts the sun's energy to food, fibre and fuel.'

In other words the biosphere, or world of living things of which we are an integral part, can function as a self-regulating natural system and maintain its basic structure, on which the very survival of its living components depend, *only if the critical inter-relationships between all its components — at all levels of organization, including that of the atom or the molecule — are maintained.*

Now to say that the biosphere has a structure means that it displays order, organization or negative entropy,



Defying the Laws of Gravity

and that the parts are subject to the influence of the whole, and hence can contribute to overall stability.

Another way of looking at this is to say that constraints limit their range of possible responses. The only situation in which there are no such constraints is that of total disorder, disorganization or entropy. Thus as the *primaeval* dust began to organize itself into ever more complex forms, so has there been a corresponding increase in constraints. The evolutionary process can in fact be regarded as the development (or more precisely the accumulation) of constraints.

As Commoner points out '... the chemical processes which are mediated by the biochemical system represent an exceedingly small fraction of the reactions that are *possible* among the chemical constituents of living cells. This principle explains the frequency with which synthetic substances that do not occur in natural biological systems ... turn out to be toxic'. He illustrates this principle thus:

- a) 'Of the approximately 100 chemical elements which occur in the materials of the earth's surface, less than 20 appear to participate in biochemical processes, although some of those which are excluded, such as mercury or lead, can in fact react quite readily with natural constituents.

- b) Although oxygen and nitrogen atoms are common in the organic compounds found in living systems, biochemical constituents which include chemical groupings in which nitrogen and oxygen atoms are linked to each other are very rare.
- c) Although the numerous organic compounds which occur in bio-chemical systems are readily chlorinated by appropriate artificial reactions, and the chloride ion is quite common in these systems, chlorinated derivatives are extremely rare in natural biochemical systems.

It is no coincidence that these chemicals are not found in living tissues. There is good reason for it. The organization that is the biosphere has been able to evolve at the expense of eliminating possible reactions between these substances and living things. If any living systems once included them, then they have been eliminated by natural selection. As Commoner writes:

'... the consistent absence of a chemical constituent from natural biological systems is an extraordinarily meaningful fact. It can be regarded as prima facie evidence that, with a considerable probability, the substance may be incompatible with the successful operation of the elaborately evolved, exceedingly complex network of reactions which constitutes the biochemical systems of living things.'

Furthermore, such theoretical considerations are confirmed empirically. Thus mercury is one of those 80 elements not found in living tissue. There is at least one good reason for this — biochemical systems have evolved a system of enzymatic catalysis in which sulphur-containing groups play a crucial role. These react with mercury introduced into a living system, and enzymes are inactivated, often with fatal results.

There is also a good reason why synthetic nitroso-compounds in which nitrogen and oxygen atoms are linked do not occur either in living tissue. They appear to interfere with the reactions involved in the orderly development of cells, and often give rise to cancer and mutations. So too synthetic organo-chlorine compounds such as DDT and PCBs are excluded from living tissue. They are often very toxic or produce long term damage such as cancer.

In general, the more the environment changes as a result of man's activities, and the less it resembles that in which we evolved, the less efficiently will our normal behavioural mechanisms enable us to adapt to it. Thus, while the human liver is capable of detoxifying those chemicals that it has learnt to detoxify over millions of years of evolution, it is incapable of detoxifying chemicals to which man has not been exposed during this period — and which are thereby likely to cause biological damage.

Perhaps, Professor Mellanby, you disagree with these principles? If not how do you explain that your research shows things to be otherwise?

If there are theoretical reasons why DDT and other such substances are harmful, there are also very good empirical ones. The amount of material that points to the biologically damaging effects of DDT is immense and growing the whole time. I cannot review it all here. I shall simply look at recent material — theoretical and empirical, that casts light on those aspects of the use of

pesticides that you have stressed in your various statements — and that is relevant to the subject of forestry and conservation.

The effect of sub-lethal levels of pollutants

Since receiving your letter I have obtained copies of many of the papers read at the recent Royal Society Meeting on the sub-lethal effects of pollutants on marine-organisms. These papers all tend to confirm the increasingly accepted thesis that exposure to low levels of many pollutants over a long period can often be as harmful as high levels over a short period. Let me quote three paragraphs from Waldichuk's paper *The Assessment of Sublethal Effects of Pollutants in the Sea*.

'In general, the harm in bioaccumulation of such substances as metals and organochlorines is usually associated with consumption of sea food by humans. Levels of mercury at 0.5 ppm and higher in the tissues of organisms that bioaccumulate this metal have not been considered seriously harmful to the organisms themselves. However, some laboratory research demonstrates that this may not be true. When fish containing as little as 0.1 ppm mercury in their muscle tissue, are subjected to a torque in a rotating cylinder, they have greater difficulty in compensating for it than the control fish (Lindahl & Schwambom 1971). Cadmium apparently affects calcium metabolism and this has adverse consequences on the otolith and the equilibrating mechanism of fish (Rosenthal & Alderdice 1976).

'Anderson (1971) demonstrated that concentrations as low as 20 ppb of DDT produced a condition response (propellor tail reflex) in trout. His experiments showed that the learnability of fish could be affected by very low concentrations of chlorinated hydrocarbons. This could have rather unfortunate consequences on the ability of fish to return to their home stream, if they were exposed to even low concentrations of DDT during the imprinting period in their juvenile stage. Kleerekoper (1976) has indicated how behavioural responses can be influenced by multiple types of alterations in the aquatic environment with a gradient in metal concentration superimposed on a thermal gradient. Chemo-receptors can be affected in organisms by pollutants, and this could be of great significance to fish not only in homing to its parent stream on a spawning migration, but also in searching for food and possibly in avoiding predators. Equilibrium in fish can be affected by uptake of mercury (Lindahl & Schwambom 1971) and cadmium (Rosenthal & Alderdice 1976).

'The effect of sublethal stress on organisms may manifest itself in other ways than causing outright reproductive failure. It is known, for example, that some stocks of adult sockeye salmon migrating up the Fraser River must cover a distance of some 500 to 600 miles (900 - 960 kilometres) to the spawning grounds in the Stuart Lakes area near the middle of the province of British Columbia. These fish have a finite amount of energy stored in their system while they migrate (they do not feed at this stage), and it is known that during certain climatically unusual years, some of the migrating fish are unable to overcome natural obstacles on their route and fail to reach their spawning grounds. The question sometimes asked is: "How many more sockeye would go unspawned if an additional pollutant stress were put in their path in the river or at its seaward approaches?" Ultimately, the sublethal stress has an impact on spawning success and the propagation of that part-

icular stock of sockeye salmon.

'A side-effect that must be taken into account in sublethal stress of pollutants to marine organisms is the impact on the general vigour of the organisms and their ability to ward off predators, parasites and disease. It is known that sockeye smolts infected by parasites succumb to lower concentrations of metals than uninfected fish (Boyce, personal communication). It is also known that fish exposed to a pollutant stress either become infected by disease more readily than unexposed fish, or may break out with a disease that previously existed only in a latent form. This is an extremely significant facet of pollution in intensive mariculture, where water quality can be an important factor in disease control.'

Do you have evidence to show that Waldichuk and the other participants of this symposium are talking nonsense? If so what is this evidence?

DDT & Malaria

What research have you carried out to show that DDT is necessary for eradicating malaria? Once more such a notion is irreconcilable with basic theoretical principles, which I went into in 'What makes Kenny run?'

As could be expected on the basis of these principles malaria has staged its inevitable comeback. The anopheles mosquito is increasingly resistant to DDT and other pesticides. Malaria keeps coming back into sprayed areas from the ones that have not been recently sprayed. Money and resources are lacking and people have become far more vulnerable to this disease because their natural controls have now been seriously eroded. WHO now admit that 'Malaria control is in a state of crisis'. However they have not explicitly stated that the whole enterprise was a fiasco, doomed from the very start, nor have they admitted how many people are today dying from the disease they only recently claimed to have eradicated. Perhaps this would make people look at their projected new campaigns to eradicate smallpox and leprosy in a somewhat unfavourable light. Professor Bruce Chwatt of the London School of Hygiene and Tropical Medicine has recently pointed out (see *The Sunday Times* May 14, 1978) how the incidence of malaria is increasing everywhere and how even national governments are reluctant to admit it. Only twenty cases were reported to WHO from France last year, yet in four Paris hospitals alone there were nearly one thousand cases. The Soviet Union has made no malaria case returns to WHO since 1972, Bruce Chwatt suggests that they are probably embarrassed by the figure. Nor have the governments of India, Pakistan and Bangladesh admitted that several million people in these countries are now dying of this disease every year. Nevertheless this is what is happening and had to *because on theoretical grounds alone insect species cannot be eliminated by waging chemical warfare against them*. If you have done research in your laboratories which shows that this is a load of nonsense and that DDT will still continue to eradicate malaria I suggest that you communicate the results of this research to WHO as quickly as possible because it may be very valuable in influencing their future policies.

Pesticides and soil organisms

I would also be interested to know what research you

have done to justify your claim that paraquat-treated fields are an ideal habitat for our wildlife. To begin with what do you know about the effects or the sub-lethal effects of paraquat on the micro-organisms of the soil? If they destroy our soil organisms, not only is soil fertility certain to decline but also the fields are unlikely to be of much interest to the wildlife that would normally frequent them. It is true that this important question has been scandalously neglected by researchers, nevertheless what we learn is fairly consistent. In the proceedings of the 6th International Soil Zoology Colloquium of the International Society of Soil Science — a massive document of over 600 pages, I could only find one relevant paper out of 93. It was written by T.J. Perfect and others and refers to the effects of DDT on soil organisms. As one would expect — on the basis of ecological principles, which you refer to as dogmas — DDT spraying, among other things, reduced the number of ants and also changed species dominance. The species *Pheidole* for instance, accounted for 37 per cent of the total ants trapped in untreated plots and only 2 per cent in treated ones. Earthworm behaviour was also affected by DDT, cast production being reduced to a very low level. Microarthropods populations also fell. Oribatid and prostigmatid mite populations were halved, the population of the Mesostigmata was actually reduced to 2.5 per cent of the level in unsprayed plots. Since the latter are important in regulating the population of collembolans the population of the latter considerably increased.

Recently it was reported in the *New Scientist* that studies conducted by M.A. Wright of Long Ashton Research Station, near Bristol, have shown that spraying with three benzimidazoles systemic fungicides caused very high mortality among earthworms. 'A soil drench, equivalent to run-off from a tree spray in an orchard of 1.5 kg per hectare, killed 60 to 70 per cent of the exposed worms within 14 days. Similarly, leaves bearing a dose of 0.8 per sq. cm of benomyl inhibited worm feeding, and double that prevented feeding completely.' This has been tentatively attributed to the fact that benzimidazoles interfere with mitosis and cause chromosomal damage.

In Wilhelm Kuhnelt's volume on *Soil Biology*, re-edited by Faber and Faber in 1976, there is again a surprising lack of material on the effect of pesticides on micro-organisms. This question is dealt with in one section of five pages. Nevertheless the conclusion is fairly explicit:

'A review of pesticides in the soil presupposes some concern about their indirect consequences on soil morphology and nutrient cycling above and beyond the possibility of obvious animal food contamination. The abundant arthropod forms are most directly affected by persistent chlorinated hydrocarbons, although the cyclodienes (heptachlor and chlordane in particular) and some carbamates are highly toxic to earthworms. Effects on the latter can cause pronounced changes in soil morphology. Soil micro-arthropods, in particular the Collembola and Acari, in combination with Enchytraeids and nematodes, have an important role in stimulating and/or inhibiting microbial activity, mycostasis and bacteriostasis. Since soil is a fabric of living and non-living components, consequences of pesticide

use may affect not only soil formation but also its physical and nutritional properties. The latter may be altered both positively and negatively by killing predators of saprophagous arthropods, or by reducing populations of the latter; thus permitting nutrients to remain bound up in detritus.

The more subtle pesticide-induced ecosystem perturbations are poorly understood, and this may be a consequence of investigator preoccupation with readily measurable parameters. On the other hand, attempts to anticipate the effects on nutrient cycling, through litter decomposition studies (Crossley and Witkamp 1964, Barret 1968); correlating ground beetle increase with species-selective Collembola mortality (Griffiths et al. 1967); measuring long-term population studies following carbaryl treatment (Stegeman 1964) observations on soil bulk density and retardation of plant growth coupled with decrease in soil moisture absorption following isobenzan treatment (Kelsey and Arlidge 1968); and correlation of sequential mortality effects with vertical penetration of the toxicant (Karg 1962) suggest that more subtle ecosystem changes are amenable to investigation.'

Quite clearly we do not know enough about the effect of pesticides on soil-organisms to justify your views, and what we do know unquestionably tends to invalidate them.

This is only one aspect of the problem. Before an ecologist can recommend the systematic spraying of our crops with a dangerous Xenobiotic substance such as paraquat he must also know its effects on the different life processes of complex forms of life which in the long run are probably more vulnerable to it than are micro-organisms. What research has been carried out on this? What do you know of the effects, in particular the sub-lethal effects of paraquat and of its decay products when used in combination with the countless other chemical substances that find their way into our soil? I think I can answer this myself. The answer is *practically nothing*. Your statement is purely gratuitous as are many of the statements that you are in the habit of making with so much authority.

Australian Forestry Commission as the best conservationist

I would like to know what research you have done which justifies your view that the Australian Forestry Commission are the best conservationists? Do you have the gall to tell us that replacing native trees that have been adapted, by millions of years of evolution to the particular soil, climatic and general ecological conditions of the area, by exotic pines that have been adapted to growing in totally different conditions; is ecologically justifiable? Yet this is what the Australian Forestry Commission is doing. If your researchers can show that it is, then you are being very anti-social in keeping this evidence to yourself. Such evidence in any case will be in conflict with all the other available evidence on the effect of growing exotic conifers on soil structures. We published an excellent article on this very subject entitled 'Conifer Plantations and Soil Deterioration' by John Pelisek (*The Ecologist*, November 1975) to which I refer you. The conclusions of Pelisek are entirely confirmed in Noirefise's article 'Aspects of Forest Management' published in the Council of Europe *Nature and Environment Series*

No 1. Pelisek is a lecturer in the Faculty of Forestry at the Brno Institute of Pedology and Geology, Czechoslovakia. Noirfelise is Professor in the State Faculty for Agronomic Sciences, Gembloux, Belgium.

I shall quote the relevant passages from Noirfelise's article.

'It is a well-established fact that the replacement of deciduous trees by conifers causes a profound change in the biocoenosis of the soil. After a short while there is a notable fall in the number of earthworms whose incessant toil is a natural form of ploughing; they undermine the soil, enrich it in humus, break it up and ventilate it. Earthworms, which are very finicky eaters, have great difficulty in dealing with conifer needles which are generally hard, waxy and rich in resin. Investigations by Ronde carried out in the Bavarian forests have shown that there is a very sharp fall in the number of earthworms under conifers with evergreen leaves, particularly pine and picea.

'This biological regression applies, however, not only to earthworms. It also affects the microfauna which live beneath the litter, break it down, digest it and prepare it for attack by microbes. The bacteria themselves which take part in the final phases of humification and release the nitrogen from the organic compounds also decrease by as much as 99 per cent under picea.

'The slowing-down of biological activities results in the accumulation on the ground surface of a thick layer of litter which is very slow to decompose. In this organic mass, which is three to five times as thick under conifers as under deciduous trees, large quantities of nutritive elements are immobilised, particularly nitrogen. It has been calculated that replacing beech by picea and oak by pine results in a loss of about 200 kg of nitrogen, 140 kg of phosphoric acid and 95 kg of potassium per hectare in the nutritive cycle of the forest, i.e. the equivalent of heavy agricultural fertilizing.

'It is easy to understand the effect of this phenomenon in infertile forest soils. It results in impoverishment of the soil whose nutritive capital can only be reconstituted when the whole of the litter has totally

decomposed after cutting down the existing trees. The immobilisation of the nitrogen and phosphorous explain in particular certain mishaps in conifer-growing such as late recovery after replanting and the delay in the growth of subsequent plantations of pine or picea, or again, the failure of natural seeding of types of tree which produce large quantities of seed. As one specialist in forest pedology, Professor Duchaufour, put it so vividly, seedlings and young plantations suffer from 'nitrogen hunger'.

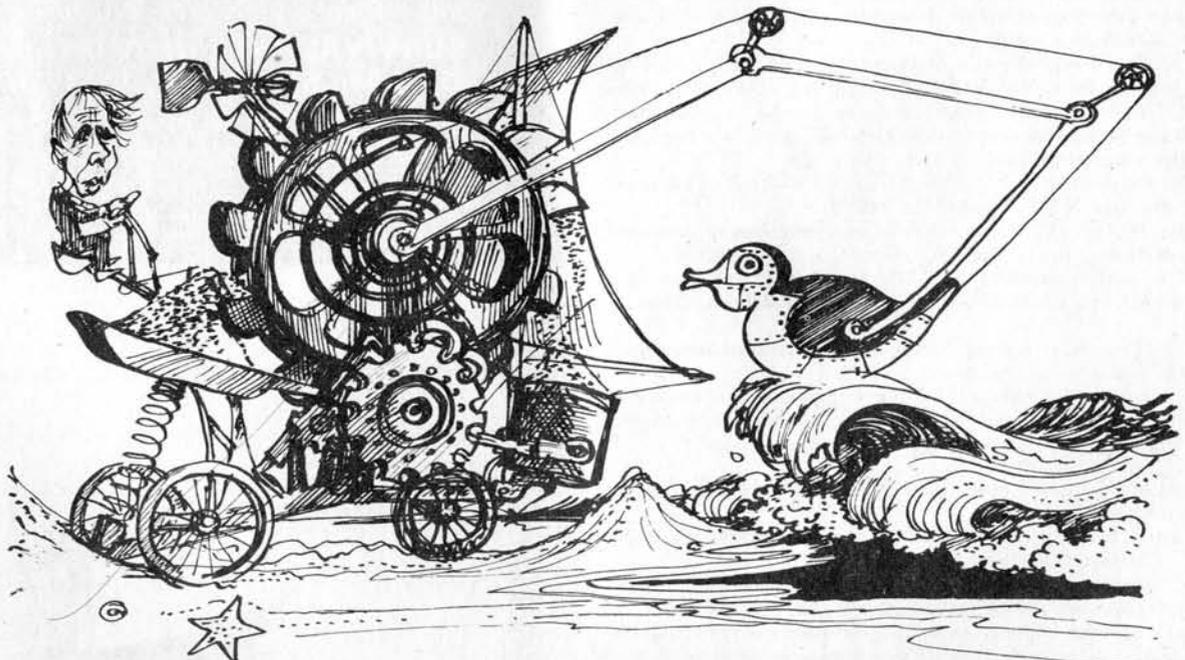
'The phenomenon of immobilisation is doubtless only an apparent impoverishment of the soil and not a true form of degradation. It may be compensated by application of fertilizers, although this is still not a very widespread practice because of the cost and the unreliability of results. Nevertheless the intensive growing of conifers can only continue provided fertilizing is carried out and also provided no other setbacks are encountered.

'The changes induced by conifers do not, unfortunately, stop at this stage. In some circumstances they may bring about an insidious degradation of the soil, a process we are only beginning to understand.

'Because of its high content in lignine and resin, conifer forest litter is mainly attacked by mushrooms which proliferate on them. The activity of mushrooms results in the production of a layer of black humus ('mor'); the humic acids contained in it and carried off by rain are capable of podzolising the underlying layer of soil.

'Podzolisation is a slow destruction of clays which reduces their power to retain and exchange nutritive elements and releases iron and aluminium ions. The former can fix phosphorus and make it inaccessible for plants; the latter have toxic effects upon roots. These processes begin beneath the layer of black humus and advance in depth at a rate depending upon the nature of the soil. Sandy, acid soils or sandy silts are apparently highly susceptible; the growing of conifers over less than two centuries can podzolise such soils to a depth of 20 to 30 cm; it is also frequently noted that on such soil there is a drop in productivity from the second plantation onwards.'

Pelisek refers to research by Meyer in Saxony which



Mellanby's perpetual motion combine harvester for intensive mariculture

shows that in an area where spruce monocultures were introduced in the middle of the last century, the annual increment of tree growth has steadily fallen until by 1929 it was less than half what it formerly was.

As could be predicted on the basis of theoretical considerations, growing exotic conifers in areas to which they are not adapted is non-sustainable as it must lead to serious soil deterioration. The other Forestry Commission practice of clear-felling is equally indefensible since it also leads among other things, to soil erosion which could be largely avoided if, instead, trees were thinned at regular intervals, as is being done more and more in Alsace for instance. A considerable amount of theoretical and empirical evidence is available on this subject. Once more I would like to see the research you have done to show that this is all nonsense.

NOTE: For a selection of letters commenting on 'What Makes Kenny Run?' (*The New Ecologist* July-Aug 1978) please turn to our Letters section.

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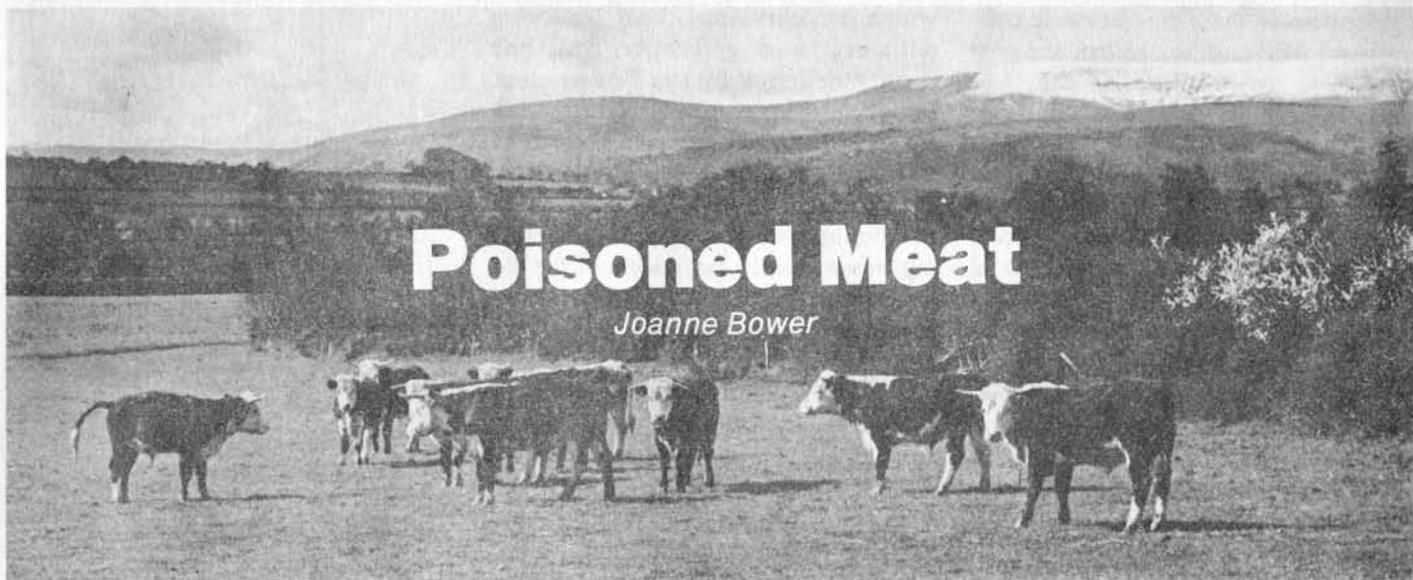
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Poisoned Meat

Joanne Bower



Barnaby's Picture Library

Because protein conversion by animals is basically uneconomic, scientists have been at pains to speed up the process, and among a variety of growth promoters developed for this purpose, chemical hormones play a leading role. On account of their connection with cancer, certain regulations were introduced in 1973 prohibiting the retail sale or supply of liquid preparations of diethylstilboestrol (DES), hexoestrol and dienoestrol 'except by a qualified medical, dental or veterinary surgeon or practitioner, or by a pharmacist acting in accordance with a prescription given by such surgeon or practitioner.' No other restrictions were imposed, beyond a recommendation that animals should not be slaughtered for human consumption within a certain number of days of hormone implantation. However, a North Devon District Council representative says:

'I agree that *recommendations* say that an animal should not be sent for slaughter until at least 90 days have elapsed, but it would be interesting to know what degree of *real* check there is on ensuring that the 3 month time lapse does take place.'

Implantation is usually carried out in the neck of poultry, or below the ears in cattle. Advice given to poultrymen is to use a clean sharp needle: 'the pellets should be inserted downwards in the neck skin as close to the comb as possible. If this is done the pellets are less likely to be dislodged and high concentrations in the flesh at killing are unlikely.' Not, one might suppose, very reassuring to the consumer,

The health hazards of hormone implants in livestock

especially as the writer goes on to say 'Remove any birds which seem to be excessively feminised . . . Keep the spare pellets in a dry place, preferably under lock and key and certainly away from the attentions of children.'

The House of Commons was informed in March 1973 that on present information there was no sufficient justification for supplying special controls for the current use of oestrogens in egg and poultry production. Nevertheless, it was admitted that France prohibits the importation of eggs from any country which does not *forbid* the use of arsenicals, antimonial and oestrogenic substances in the feeding and rearing of poultry.

As regards implantation in poultry, David M. Pearce, for the National Institute of Poultry Husbandry, has claimed that DES is rarely used for caponisation, having been largely replaced by the 'less toxic' hexoestrol, although sometimes a combination of both hormones is used. (Evidence given by a number of doctors to the U.S. Department of Health, Education and Welfare in Washington, D.C. in 1956 was that the administration of the group of substances to which stilboestrol (DES) belongs had induced, in experimental animals, polyps, fibroids, and cancers of the cervix, cancers of the breast, and serious pathological changes in sexual organs of male animals.

Pellets removed from an animal one year after implantation were found to retain sufficient activity to induce a tumour upon being reimplanted in another animal.) Mr. Pearce considered that 10 million cockerels and 2 million turkeys a year implanted with hormones would be a generous estimate.

However, the implantation of cattle with hexoestrol, DES, trienbolone acetate (marketed as Finaplix) and zeranol (Ralgro) is common practice. *Farmers Weekly* admits that 'Questions on their mode of action in the animal and possible hazards both to treated stock and consumers through residues in the meat have still to be answered.' Evidence in slaughterhouses has revealed that cattle may be sold before the recommended withdrawal period has elapsed, and there have been cases where pellets have been implanted in edible sites, including the neck and rump: 'Pellet residues may remain at slaughter and, apart from the hormone effects, may be potentially carcinogenic. Health Authorities are understandably nervous about the possible side effects on stock and people who consume treated meat' says *Farmers Weekly*. Thamesdown Borough Council is one local authority which discovered numbers of hormone pellets in the necks and shoulders of calves for slaughter, to the extent of ten in an animal, oestradiol/progesterone and oestradiol/testosterone having been used. A one and a half pound sample of meat containing residues of hormone implants was declared by the Public Analyst to be unfit for human consumption.

Because of their carcinogenic connection, DES and hexoestrol are now subject to strict control in the U.S. and much of Western Europe. Zeranol, an anabolic agent, although not a steroid like the other sex hormones, has some oestrogenic effects and its precise action in livestock is not fully understood. It is used for both cattle and sheep.

To obtain the maximum artificial growth rate 'an animal needs both the male hormone status of a growing bull and the female hormone status of a young cow.' The anabolic agents stimulate the animal's own anabolic steroid lasts long after the Institute for Research on Animal Diseases, tells us: 'What is missing from the bull is oestrogen, so for an improvement in growth rate, oestrogen, hexoestrol or diethylstilboestrol has to be used.'

Pellet residues may remain in a carcass after slaughter and are potentially carcinogenic.

At a conference in Rome, sponsored by the World Health Organisation and Food and Agriculture Organisation, in 1975, scientists expressed concern that residues of synthetic oestrogens could remain in carcasses, creating a risk of feminisation and development of cancer. They agreed that the use of anabolic preparations should be subject to official regulations and that an attempt should be made to reach world-wide agreement on this. So far, no progress seems to have been made. Meanwhile, the use of hormones in our livestock continues. At the Ministry of Agriculture's experimental farm at Drayton, Warwickshire, during the finishing period of an 18 month beef system, three types of implant are used: zeranol, trienbolone acetate and hexoestrol. Anabolic agents come within the 1968 Medicines Act, under which zeranol has been granted a full production licence. Full licences have not yet been granted for hexoestrol and trienbolone acetate, but because they were marketed before the Medicines Act became effective in 1972, they may be distributed under 'licences of right'.

Among other uses of hormones are treatment with prostaglandin,

which synchronises heat in cows without lowering fertility. This has been sanctioned by the Government under veterinary supervision, and is the first such hormone in the world to be licensed by a Government for commercial use in cattle. The only restrictions are that milk from lactating cows should be withheld for 24 hours after injection and meat from carcasses of casualty animals should not be eaten for seven days.

American legislation requires a complete absence of residues in meat using present detection methods. But how reliable are these? It is known that the effects of an anabolic steroid lasts long after traces can be found in the body. These are detectable for up to two weeks after administration to athletes, but the effect can last several months. Research workers in the U.S. have reported a worldwide epidemic of gallstone disorders as a result of the use of oral contraceptives, changes in the chemical composition of bile predisposing women on the hormone pill to gallstone formation. These researchers report that regular hormone treatment causes a multitude of biochemical changes in the body, and that the long-term effect of such changes cannot be measured finally until the present generation of women have completed their natural life span.

The silence of the medical profession in this country as to possible consequences of continually eating meat from hormone treated animals is very puzzling. Such consequences are of course difficult to assess without long-term observation, but available evidence would suggest that it is only fair to consumers to let them know that hormones have been used. The Farm and Food Society in recent evidence to the Royal Commission on Environmental Pollution has asked that the whole subject of hormone administration to livestock should be passed to the medical profession for advice. This would at least bring it to the attention of doctors and others, who might hesitate to approve what is going on in a field which is known to involve considerable health hazards, already recognised in other countries. It is many years since Dr. Francis Bicknell, in his book *'Chemicals in Food'* warned: 'No woman should eat commercially bred chickens or meat that she knows



have been treated with oestrogens.' More recently Professor Debachere of the University of Ghent stated that certain hormone injections used in veal production carried a cancer risk greater for men, as it affected the prostate.

The controls imposed by our own Government on DES, hexoestrol and diennoestrol apply only to liquid injectable preparations and not to other preparations of these oestrogens administered orally, by implantation or as feed additives. It seems likely therefore that most of our meat has been contaminated by hormones in one way or another. Perhaps the £2.4 millions set aside for meat promotion might be used more profitably for the health of the nation in examining 'the pressing demand for livestock products', including the mountains of beef and lakes of milk for which there appears to be no demand at all.

Joanne Bower

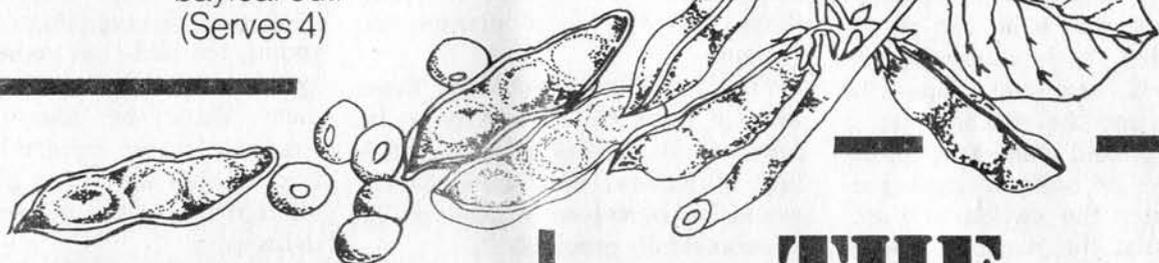
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Soya Casserole

200 g (7 oz) or 1 U.S. cup cooked soya beans
2 tablespoons vegetable oil
1 bayleaf
75 g (3 oz) or 1 U.S. cup mushrooms
(optional)
50 g (2 oz) tomato purée or
3 tablespoons tomato sauce
1 large chopped onion
75 g (3 oz) or 1 U.S. cup cooked
wholemeal macaroni rings
1 tablespoon soy sauce
900 ml (1½ pint) or 4 U.S. cups stock

Sauté the onions in the vegetable oil until they are a clear colour. Add the garlic, cooked beans, mushrooms, bayleaf tomato purée, and soy sauce. Mix well. Add the stock and the macaroni and bring to the boil. Simmer for about 15 or 20 minutes to allow the flavours to blend. Take the bayleaf out.
(Serves 4)



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Big Brother in a Box

**Andrew Gordon, Malcolm Bush, John McKnight, Linda Gelbard,
Tom Dewar, Kathy Fagan, Anna McCareins*

Bureaucracy survives by fostering the idea of dependence. At first we have the illusion of choice, but acceptance gives way to expectation and then to need . . . the process of enslavement is already with us.

There is available on many toy counters an unusual and instructive machine. It is a battery-operated five-inch box with a lid and an exposed switch. It is otherwise unadorned. If someone flips the switch to turn the machine on, a grotesque hand emerges from beneath the lid with a single purpose: to turn the switch to "off" again so that the machine can sit silently until someone else turns it back "on".

In one sense this is a perfect machine. The hand effectively carries out its mission — to prevent any outside interference with whatever is going on inside the box.

Imagine a bureaucracy which is similarly perfect, one which operates only in ways that guarantee its continued smooth operation and does not brook interference from the outside world. Let us imagine further that this box is a service bureaucracy, an organization whose public function is to serve people who need help. The service may or may not require institutionalization. The bureaucracy may be public or private. How would this box bureaucracy be organized if its sole aim were to guarantee its own smooth operation, without any interference or complications?

The task can be broken down into four major areas: (1) the creation of need; (2) the management of client-

ele; (3) the control of information and accountability to nonclients; (4) the growth of public perceptions of need.

1] The creation of need

The box must appear to serve not itself but society, and in so doing relieve the public of a major burden. Therefore, a needy class must be defined. The definition must be broad enough so that the potential clientele is greater than the box's capacity to provide service. The box will then be able to reserve the ultimate right of selection from that needy class, taking care to select those who will least disrupt the system.

The ideal clients would be those least in need of the service to be provided. A show of effort, a shuffling of papers, and these clients would be perceived by the public as successfully processed.

Ideal clients are also personally powerless and unconnected with assertive outside interests, minimizing outside interference. The aged, the poor, or the children of the poor seem especially well-suited. Since these categories of people are also the most apparently in need of benign care, they are doubly ideal.

Effective public relations requires that some clients who are obviously in genuine need of service be accepted as well. However, should totally disruptive clients be accepted through public pressure or faulty screening, liaisons can be established with other less visible and legitimately coercive agencies to assure stability.

2] The management of clientele

In the perfectly managed box, the clients' needs may sometimes hinder the provision of service. Therefore, the managers of the box first decide what services can be provided without undue inconvenience, and take steps

to persuade clients that those are the services they need.

Nonetheless, some clients will criticize the quality of the service they receive, or declare themselves 'served' and ready to look after themselves. Clients must be persuaded that their perception of their own needs is fallible, that they do not have the training or skill to judge the services they are receiving and that they must never trust their own opinion of whether they are sufficiently served. The language anticipates us: the Latin root of the word "client" is a verb which translates to hear, to obey. They should be made to understand that they are too young, too sick, too neurotic or too ignorant to rely on their own judgment. Once the clients are persuaded of their correct needs, the box ensures that they perceive no alternatives to the service the box delivers.

The labels used to define clients must stress their weaknesses and ignore their strengths. Promoting the common understanding that clients are alike only in that they are all deficient, inhibits them from recognizing and exploiting their individual and collective strengths.

Clients must not be allowed to contribute to, or even have access to, the records describing their progress. All of their behavior should be suspect, and fit material for manipulation.

A few clients might still display some behaviors disruptive of the daily routine of the box. However, this can be discouraged by labelling as desirable that behavior which assists the smooth running of the service machine, and by treating as deviant those acts which interfere. In fact, unruly behavior can be viewed as symptomatic of the

** The authors are students and faculty at the Center for Urban Affairs, Northwestern University, Illinois.*

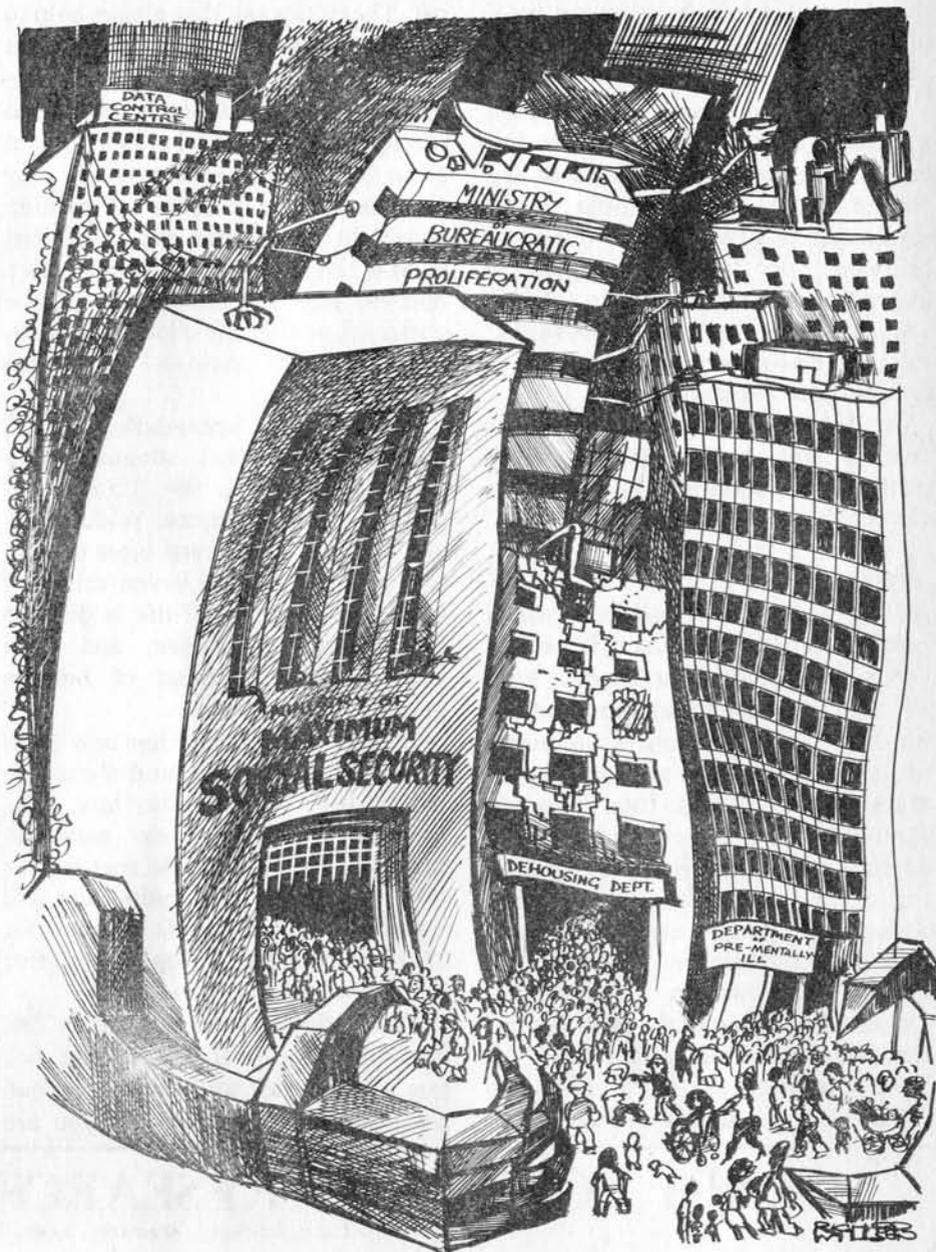
client's need for more intensive services. The box can ensure adherence to that behavior which suits it by a system of rewards, punishments, persuasion and group pressure. If subtle controls do not work, the box could employ forms of physical restraint (incarceration), physiological control (drugs) and psychological manipulation (therapy) which further strip the clients of power.

3] The control of information and accountability to non-clients

Since the box dispenses kindness, few will question its activities. At its best the box appears benign to the public, to the clients, and to the helpers. However, the box will be required to account to the public for monies spent, services purchased, and services delivered. The public will occasionally demand information about its inner workings and accounts of its stewardship. The solution is to persuade the public that the only people competent to examine the box's operations are those who have been licensed and trained in its specialty; no one else has the skill to appreciate its methods or to evaluate its results. As an additional precaution, it would suggest to those who do not understand its specialized language that the fault is theirs. The box would deny information to those who try to pry further, undermining their credibility by scoffing at their experience, their training, and their competence.

It may be necessary in some cases to assure the public, through an apparently independent audit, that the box's services are working. This appearance can be created by an interdependent web of interests, incorporating training institutions, professional associations, licensing bodies, paid evaluators and professionalized funders of evaluations. These symbiotic interests, rooted in a common system of values, will preserve the illusion of independent accountability.

The professional helpers can also create organizations appearing to regulate professional conduct while, in fact, bearing down heavily on colleagues who would challenge time-hallowed procedures. The scope of these professional organizations guarantees influence at all



levels of government, insuring maximum public funding and minimum accountability.

If the box were still required to submit to external inspection, it could turn even this demand to an advantage. It agrees to evaluation of its methods and systems, never its outcomes. The box will answer questions which are consistent with its own goal of smooth functioning. It will thwart and otherwise circumvent questions which entertain the alternative value of maximizing clients' well-being.

Persistent outsiders may insist on evidence of successful service. Placebo recoveries, spontaneous remission, and healthy clients who have not been harmed provide examples of putative successful treatment. The box's monopoly of

the skill to diagnose both needs and successful outcomes increases the likelihood of acceptable evaluations.

For any unconcealable failures — clients whose disability the box has not helped, has exacerbated, or has even created — the appropriate strategy is again to turn a possible embarrassment to an advantage. The box can assert that the problem is caused by lack of funds, citing high client-helper ratios, low salaries, poor technology and insufficient research. The operating assumptions of the box should never be questioned; rather, the public must understand that what is needed is more of the same.

The box can also persuade the public that what it perceives as failures are really successes. Whatever now troubles the "failed client"

is minor compared to the problems the client had before or would have had without the box's professional intercession.

Another approach to perceived failures is to shift the blame to the client. The box can explain that the clients were beyond help when treatment began. Genetics, neighborhood, or family constellation guaranteed failure. If the clients are poor, minorities, or dispossessed the public usually will be prepared to accept these explanations.

If all else fails, the box can suggest that it was not allowed enough control to enable it to help the client.

4] Growth

If there is any untidiness which remains in this system, it is caused by the constant need to react to non-client groups. This problem must not be dealt with by taking a defensive position. Rather, the service bureaucracy should tackle this irritating remnant by a concerted effort to expand its hegemony. By expanding the number of clients, the number of non-clients who are potentially disruptive diminishes. The box must enlarge the stream of potential clients and demand more resources for its increased responsibilities.

The policies of reformers who criticize the accepted forms of

service can also be used to widen the net. The critics say that giving help to a single person outside the context of his family is self-defeating. Therefore, the entire family is invited to therapeutic sessions, involving them all in the problem. Some critics may also decry the practice of placing people in institutions and insist that clients be served in their own houses. The box should accept the criticism, so that the client's parents, brothers and sisters may also become clients.

Beyond the immediate family, others who are not obviously sick are susceptible to the "crises" of childhood, adolescence, middle age and old age. The seven ages of man are replaced by the seven crises of man. The meaning of life is defined by a series of crises, and each attracts its own band of helpers and institutions.

The concept of need has now been stretched to its limit, and there are still people outside the box. The helpers must therefore persuade those remaining outside that unless they, too, are given help they will not retain that enviable position for long. And so the box begins to offer services to the "pre-needy".

The logic of the argument is disarmingly simple. If you are not sick you are pre-sick and therefore need attention and check-ups. If you are

sane you are pre-mentally ill and should seek help. If you are law-abiding you are pre-criminal and should be given therapy to prevent a decline into lawlessness.

There remains one final step. No human behavior is to be considered authentic without the stamp of the experts' approval, which is never given.

The stable state for a service bureaucracy has been achieved. There is no one to pull the switch on the box because there is no one outside the box. Everyone perceives their meaning in terms of clienthood. People confidently approach the box demanding that they be admitted in order to become whole.

There is no longer a necessity for the service bureaucracy to justify its existence in order to survive and expand. Indeed, the client will have "forgotten" that there should be a relationship between need and service. They will use the box because it is there. They will feel incomplete, unreal, and lacking, not because they have a need, but because they cannot get into the box.

As a result, the issue of equity is defined as the *right* to enter the box. Finally the law will be inverted, with equity defined as the right of the *box* to encompass all.

HENRY DOUBLEDAY RESEARCH ASSOCIATION

Convent Lane, Bocking, Braintree, Essex

WARNING ON COMFREY

We, the Committee acting in accordance with our honorary Medical Adviser say 'the use of Comfrey internally must cease'.

Ragwort, Crotalaria, Borage, Echium and Heliotrope contain pyrrolizidine alkaloids which can cause liver damage leading to liver cancer and wild heliotrope seeds contaminating wheat in Afghanistan recently caused illness in 22 per cent of the people in one district and several deaths (Lancet 1976, 2691). Comfrey contains the same alkaloid, just as potatoes contain the same alkaloid as woody nightshade, and therefore a world authority on alkaloids, Dr C.J.C. Culvenor of the C.S.I.R.O. Animal Health Division at Melbourne, Australia, has warned against eating or drinking comfrey by human beings and animals.

He is now starting work on comfrey and said in a letter to me, 'I believe that our warning is warranted until adequate investigations have been made. We are now setting about long term studies which may provide the answer, but these studies may take two or more years.'

The Henry Doubleday Research Association of Australia has flooded Dr Culvenor with accounts of successful stock feeding and experiences of the healing value of comfrey. They have now sent a questionnaire round to all their Members to locate those who have eaten most comfrey for longest. Most at risk are vegans who try to take all their Vitamin B12 from comfrey, which is not possible because there is too little in it. The young leaves contain the most alkaloid, mature leaves about a fifth as much and dried tea least of all. Blood tests which will show any malfunction of the liver are being arranged.

A leading British expert on these alkaloids is Dr C.R. Crout of Exeter University. While it would be scientifically desirable for him to repeat Dr Culvenor's experiments we cannot afford the £24,000 this would cost. The H.D.R.A. is therefore paying the University to analyse for the alkaloid at £120 a shot for this time consuming and difficult test, to find immediate answers to the questions every comfrey user is asking. The

first test was with our comfrey ointment, which showed only three parts per million of alkaloid, and is in Dr Crout's opinion, entirely safe. So are fresh, or pulped leaves or comfrey flour used as dressings or poultices, as directed in 'Comfrey The Herbal Healer' for the alkaloid is not absorbed through the skin. The risk lies in eating or drinking it for long periods.

We are awaiting results from Dr Crout who is analysing our comfrey tablets, tea made with fresh or dried comfrey leaves, cooked flour and cooked fresh leaves, because the heat appears to effect the level of the alkaloid. Though the damage to the livers of experimental animals and human beings from the alkaloid (in plants other than comfrey) is cumulative, this is from successive doses, unlike D.D.T. and other organo-chlorine compounds which build up to danger in our body fats. The alkaloids come apart easily because they are natural and break down quickly like nicotine. Therefore comfrey foliage in compost, in potato trenches, as liquid manure or a mulch is as entirely safe as the ointment.

Dr Culvenor considers that the risk for ruminants, cattle, sheep and goats is less than for human beings, because they have a mechanism in their first stomachs that can destroy a large proportion of the alkaloid, and pigs have a protective factor that helps them to resist many poisons.

The 40 years for which the late Vernon Stephenson fed comfrey to race-horses and the fact that there is always a post mortem when an expensive horse dies, which has never shown liver damage in all the years it has been fed, makes the risk small, but there must still be a warning for all stock and human beings. Until we issue a further statement no human being or animal should eat, drink or take comfrey in any form.

Lawrence D. Hills

Radiation Risks – how low can one get?

Peter Bunyard

Serious evidence has come to light that 'safe' doses of radiation can cause high rates of cancer. Thousands of people have been exposed yet the Nuclear Industry seems intent on suppressing the information . . .



Since the days when Madame Curie walked around with samples of radium in her pockets and radiographers used their x-ray machines without the protection of a lead screen, physicists, physicians, biologists and engineers have learned increasingly to respect the power of radiation to induce cancers and bring about genetic mutation. By the late 1920s the International Commission on Radiological Protection (ICRP), together with various government agencies, had come into existence to review what was then known about radiation and to draw up guidelines by which both workers and the public would be protected. The Commission's task was complicated by the long interval – the latency period – between the radiation dose and the manifestation of cancer; genetic effects could only be guessed at from the few animal experiments that had been done. Nevertheless the Commission boldly suggested permissible radiation doses of up to seventy-three rems a year for those such as radiographers whose occupations involved working with radiation. By 1936, the ICRP had reduced its recommended permissible doses for occupational persons to fifty rems, then to twenty-five in 1948, fifteen in 1954 and to five rems in 1958. There the level has stuck, and the inference is that enough is now known about radiation effects to warrant no further drop. Indeed the various

atomic energy bodies, including the US Atomic Energy Commission (AEC) – now incorporated into the Department of Energy – and the UK Atomic Energy Authority, have persisted in their claim that there have been no fatalities caused by radiation in the civilian use of atomic energy for electricity generation.

What if these claims are wrong? What if there have in fact been fatalities actually brought about by radiation in the civil atomic energy programme? What if the levels deemed safe by august authorities like the ICRP are out by a factor of ten or even twenty? Evidence is now emerging that radiation is far more effective in bringing about biological harm than could ever be inferred from such traumatic events as Hiroshima or Nagasaki, and it raises considerable doubts about the long-term future of nuclear power.

Dr. Alice Stewart and her colleague, statistician George Kneale, have been working on American data with Thomas Mancuso from the Department of Industrial Environmental Health Sciences in the University of Pittsburgh. According to them, the cancer risk from the currently permissible dose of 5 rads per annum may not be 1 in 2000, but 1 in 250 – the equivalent of smoking forty cigarettes a day. Their discoveries have embarrassed both the US Department of Energy and in the UK the National Radiol-

ogical Protection Board (NRPB) which takes its cue from the ICRP. In the US Mancuso has had his grant prematurely brought to an end; in the UK Stewart and Kneale have landed themselves in a bitter controversy about their results. They were both at the Windscale Inquiry, yet in his report Justice Parker dismissed their evidence simply because the NRPB experts disagreed with it. Luckily these reverses have not prevented Mancuso and his British colleagues from continuing their work. The new evidence they have collected has served both to tighten the argument and to confirm the validity of their original findings. They have no doubts left that low dose radiation is an effective agent for inducing cancer and for bringing about genetic change in the human population.

The Windscale Inquiry concerned British Nuclear Fuel's (BNFL) proposed thermal oxide reprocessing plant – THORP – which has now been given the go-ahead by parliament. In his Windscale Report, Mr. Justice Parker acknowledged that a ten-fold increase in the known effectiveness of radiation to induce cancer, let alone to bring about genetic mutation, would 'seriously affect the whole picture'. Not that Parker was seriously contending that nuclear power would have to go by the board; in the best of legal traditions, he set out to discredit Stewart so that all her arguments would tumble with

her, and *ipso facto* permissible radiation doses could continue to be pronounced safe.

Early research at Hanford

Stewart and Kneale's evidence is based on a long-term study of workers at the Hanford Atomic facility at Richland, Washington, which is one of the main US government reprocessing plants for extracting plutonium from irradiated fuel. Dr. Thomas Mancuso was actually called in to study the Hanford workers in 1964 by the then Atomic Energy Commission. He had already established an international reputation for his research on the long-term biological effects of chemicals in the environment and in 1962 the National Cancer Institute awarded him the National Career Development Award for his research into environmental cancer. Not that the AEC was expecting Mancuso to find any untoward effects of low dose radiation; rather the opposite, it was hoping that radiation workers would be given a clean bill of health.

Mancuso's research for the AEC involved sifting laboriously through the files of many thousands of men and women who had worked in Hanford since 1944 to see whether there was any possible link between their exposure to radiation and deleterious effects on health. One reason Mancuso had been assigned the task was because he had established a system by which the fate of the great majority of individuals in the US could be traced through their social security numbers. The same numbers are used to claim death benefits either for funeral expenses, or pensions. Consequently actual death certificates can be traced even when the patient dies far from his original place of work or when the date of death is much later than the termination of work in a particular establishment.

For the first twelve years of his research, Mancuso could find nothing to indicate a specific effect of radiation on the health of workers, then in 1977 he got positive results and called in Alice Stewart and George Kneale. In the University of Pittsburgh, Stewart and Kneale went through the mountains of material gathered by Mancuso, and found a strong association between radiation exposure and cancer among the Hanford workers.

Hidden effects in children

Like Mancuso, Stewart had pioneered epidemiological research. In 1955, as a reader in Social Medicine at Oxford, she set out to determine why the leukemia rate had increased significantly among the young and old since the second world war. The Medical Research Council turned down the project, but undaunted Stewart funded the study from her own limited resources. She already had an inkling that those children who died of cancer had somehow been subjected to a non-recurrent single event before birth, but quite what it was she did not then know. She contacted all the medical offices of health in the country and so traced the mothers of children who had died of leukemia. One of the questions she asked them was whether they had been x-rayed during pregnancy. A highly significant fact emerged from the survey — 1,141 of the mothers of the 7,649 children who died of cancer had been exposed to pelvic x-rays compared with 774 of a control group matched for sex, age, date of birth and the area in which they were born. Not that Stewart attributed the entire post-war increase in childhood cancer to the use of x-rays. 'I was looking for what masked cancer, not what caused it,' she told *The Ecologist*.

'One curious fact was that many of the mothers of the dead children claimed that until they produced symptoms of cancer the children seemed to be the healthiest of the family.' Stewart therefore came to believe that the post-war use of antibiotics was keeping children alive long enough for them to manifest their cancer whereas before the war they would have died of a secondary infection. Her crucial point is that leukemia and cancers in general weaken the body's resistance to secondary, infectious diseases which are consequently seen as the prime cause of death.

Radiation dose effects in the nuclear industry

The Hanford data has proved a breakthrough for Stewart and Kneale; not only has it confirmed their earlier work on childhood cancers in respect of the effectiveness of radiation in cancer induction but the guesswork involved in assessing the x-ray dose has been eliminated by the fact that the Hanford workers employed in risk areas wear radiation discs. The monitoring of the radiation dose each man received has provided Kneale with material for a sophisticated mathematical analysis.

The Hanford records go back to



Dr. Thomas Mancuso

1943 when the plant first came into use for the production of plutonium for atomic warheads. At the time of the Windscale Inquiry, Mancuso and his British colleagues had sifted through the certified deaths of 3520 Hanford workers, covering the period 1944-1972. They found that 670 of that number had died of cancer, and the remaining 2850 from other causes. The key fact was that 66 per cent of those who died of cancer had had one or more positive radiation badge readings, compared with 61.1 per cent of those who died of other causes. The mean radiation dose for those exposed workers who died of cancer was also higher than the dose for those exposed workers who died of other causes — 210 centirads compared with 162 centirads. Overall the cancer group (including non-exposed workers) had a higher mean radiation dose than the non-cancer group — 138 versus 99 centirads.

Such data would seem to indicate a clear-cut link between low dose radiation and cancer at the Hanford works. All the same not everyone interprets the evidence that way. For the most part investigators tend to align themselves on one side or the other according to whether or not they are working within the atomic energy industry. Opponents of Mancuso and his colleagues either claim that evidence for any increase in cancer is the consequence of faulty statistics, or that the increase is caused by factors other than radiation — chemicals for example.

Burying the truth

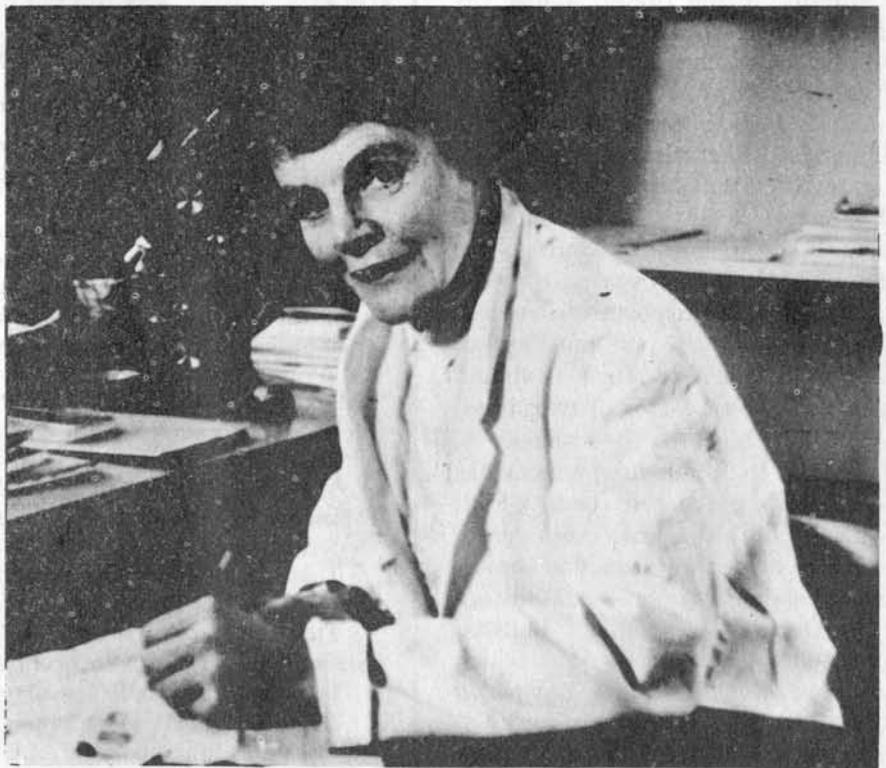
The irony is that until 1974, when his findings were negative the AEC — then part of ERDA — wanted Mancuso to publish, in order to allay fears about low radiation. ERDA, which had undergone yet another bureaucratic transformation to become the Department of Energy — changed its tune when Mancuso began to get positive results and suggested that further research was necessary before his findings were made public. When that failed to restrain him they recommended that the data he had accumulated should be taken away, and that he be barred from further access to information on the Hanford workers.

The first signs of trouble for the US Department of Energy came in 1974 when Dr. Samuel Milham, an epidemiologist at the Washington Department of Health, released findings of a 5 per cent higher than expected incidence of cancer among Hanford workers. ERDA officials at once requested Milham to withhold his results, and, as he has since told a Congressional Committee investigating the low dose radiation controversy, he agreed only because he knew that the Mancuso study was in progress.

Meanwhile, Dr. Sidney Marks of ERDA contacted Mancuso and asked him to issue a press release, prepared by Marks, which repudiated Milham's findings. Mancuso refused on the grounds that any statement of his at that time would be premature and not based on scientific findings. Early in 1975, ERDA informed Mancuso that his grant would be terminated in 1977 and that his study would be moved lock, stock and barrel to the US government establishment at Oak Ridge. James Liverman, then assistant administrator for environment and safety at ERDA, gave Mancuso's 'imminent retirement' as the reason for the transfer — a somewhat unconvincing excuse considering that Mancuso was then only 62 and the policy of the University of

Pittsburgh is to allow research professors to continue working until they are 70. Liverman later admitted that the use of the words 'imminent retirement' was 'unfortunate, inappropriate and perhaps even an error'. Later he said that the real reason for Mancuso's dismissal was 'a judgement by Mancuso's scientific peers that the work should be limited, terminated or another investigator selected to be principal investigator.' When pressed further Liverman was forced to admit that he had never seen the actual peer-group review, but had read, instead, a summary written by Marks. In fact it transpired that Marks had been the *only* member of the six-man review body who had recommended that Mancuso's research be stopped. It is perhaps no coincidence that Marks, having left ERDA for Battelle Pacific Northwest, is now supervising the official continuation of Mancuso's work.

'The fact that Marks who was in on and seems to have initiated the action against Mancuso now shows up as supervisor of the project . . . is just ludicrous,' commented Representative Paul Rogers who heads the Congressional Subcommittee on Health and the Environment. 'I think without question there was an effort to bury Mancuso's conclusions.'



Dr. Alice Stewart

The congressional investigation into the Mancuso study has certainly forced a change in attitude at the Department of Energy. In February this year, James Liverman told Rogers and his sub-committee that current exposure limits 'provide adequate assurances for the protection of workers and the general public.' Barely three weeks later he admitted that 'recent results of an epidemiological study of Hanford workers occupationally exposed to low level radiation appear to demonstrate adverse effects on the health of workers . . . these results if accepted at face value raise serious concern about the adequacy of exposure standards.'

Cover up at Windscale?

Meanwhile the claims and counter-claims concerning low dose radiation have moved to Britain both through Stewart's and Kneale's involvement with Mancuso and because of the Windscale Inquiry. Indeed Justice Parker's report, in which he dismissed Stewart's evidence and hence the validity of Mancuso's study, has already been accepted by the US Department of Energy as an indication that British researchers have looked at the study and found it wanting. Something of the same kind of cover-up revealed by the Roger's sub-committee in the United States has also emerged in the UK following the Windscale Inquiry. At the Inquiry, Professor Edward Radford, chairman of the US Committee on the Biological Effects of Ionising Radiation, testified that current occupational exposure levels are too high by a factor of ten and needed to be changed. He also revealed that the air standard for exposure to soluble plutonium — a key pollutant both at Hanford and at Windscale — should be lowered by a factor of two hundred; firstly because the capacity of plutonium to induce lung cancer has been underestimated twenty-fold; and secondly because the radiosensitivity of the bronchial epithelium has been underestimated ten-fold. During the Inquiry Radford referred to published data which he did not have with him, but which supported his case. Since the evidence was not in front of him, Parker refused to accept it. Radford then pointed out that Sir Edward Pochin

of the National Radiological Protection Board, who was one of Parker's two assessors, had the papers in question and could testify to their contents. Pochin denied having the papers, but has since admitted to *The Ecologist* that although the relevant papers were not with him 'at the material time' they were in 'an untenanted cottage 300 miles away.' Parker did not insist that every effort be made to get the papers either then or before he prepared his report, even though he had sent researchers — at considerable public expense — to check radiation levels in the Manchester water supplies and in the town of Ravensglass. It can surely be argued that bona fide evidence of the harmfulness of low dose radiation is more important than a publicity-seeking move of dubious or even negligible scientific value.

Before the Windscale Inquiry began Alice Stewart was asked by a number of objector groups to testify for them and she finally accepted the Town and Country Planning Association's request. 'But I would have been equally happy to give evidence on behalf of BNFL if I had been asked,' she assured *The Ecologist*. Indeed, as she pointed out, if BNFL had nothing to hide it could have

accepted the possibility that low dose radiation was more dangerous than was previously believed and stated clearly at the Inquiry that it would be perfectly possible to work within more stringent safety conditions. It is an argument that Parker might have accepted, and it would certainly have gone against the objectors' case. Instead BNFL's and the NRPB's reaction to Stewart's evidence and that of others like Radford indicates an underlying anxiety that more stringent requirements would lead either to the impracticability of THORP or to its economic failure or indeed both.

The Evidence from Hiroshima

Stewart has since replied to Parker's assessment of her evidence in both *Vole* and *The Lancet*. Parker had noted that in a paper by Dr. Ethel Gilbert of Batelle, the difference in exposure rates could be explained in the figures for two work periods — under and over two years. Stewart then produced, at Parker's request, her own table of the same division, and although the figures showed that Gilbert was correct in her findings for exposure rates, they also showed that radiation doses were higher for cancers than for non-cancers in both work periods.

Atom Workers' Union Backs Mancuso

Text of Oil Chemical and Atomic Workers Resolution:

Whereas, the DOE (formerly AEC and ERDA) has improperly tried to stop the publication of research findings of vital importance to the health of atomic workers; and

Whereas, Dr. Thomas Mancuso has been stripped of his funding to continue his research on workers' health in nuclear installations; and

Whereas, the DOE is attempting to remove the raw data from more than 200,000 atomic workers from Dr. Mancuso's control; and

Whereas, Dr. Mancuso's study is probably the most important study on atomic workers ever conducted with implications that challenge the arbitrary and capricious way management and the government have dealt with worker health and safety in atomic installations;

Therefore, be it resolved:

That, the OCAW Atomic Energy Council demands that Dr. Thomas Mancuso be provided with the necessary funding from the appropriate federal agency;

That, Dr. Mancuso be allowed to continue the study of the information compiled under Contract E[11-1] 3428 from the former AEC;

That, DOE keep from attempting to influence the exercise of free scientific inquiry into the occupational health status of atomic workers.

Be it therefore further resolved:

That, the OCAW International Executive Board adopt the appropriate resolution calling upon the ALF-CIO to mobilize its efforts to accomplish the intent of this resolution.

Parker also pinpointed a criticism raised by Gilbert that Stewart and Kneale's conclusions depended on one man dying of cancer just before rather than after his seventieth birthday. At his suggestion Stewart then supplied the Inspector with a new table based on a larger sample. This was submitted before the end of the Inquiry. 'In spite of this' says Stewart 'in his Report he chose to ignore this material which strengthened our original conclusions'. Indeed since the publication of the report Stewart and Kneale have been able to resolve several points of difficulty in their original paper, published in *Health Physics*.

One anomaly, since resolved, was that the Hanford statistics initially seemed to indicate that far from having a life-shortening effect, radiation exposures of workers had reduced the risk of dying from any cause by roughly one third. By taking into account such factors as the year employment started, the age of the employee at commencement and the period of exposure, Stewart and Kneale were able to explain the curiosity. The truth was simply that young men are likely to live longer than old men, and it was these young men who were being recruited into the more dangerous occupations.

Equally important to their argument, is Stewart and Kneale's discovery that the cancers appearing among the more heavily radiation-exposed men are of a kind that would be expected to conform to induction by radiation. The close correlation between radiation dose and the induction of radiation-sensitive cancers has also demolished Dr. Gilbert's proposal that the cancers may have been caused by chemicals or other environmental factors. Mancuso, Stewart and Kneale have estimated the dose of radiation necessary to bring about a doubling of specific cancers. Thus bone marrow has an estimated doubling dose of 3.6 rads, the lungs of 13.7 rads, the pancreas, stomach and lower intestine one of 15.6 rads.

The sensitivity to radiation of bone marrow, lungs and pharynx is an order of magnitude higher than that indicated by studies of atom bomb survivors and patients irradiated in the past for treatment of ankylosing spondylitis. Yet Stewart

believes that by using such data the cancer risks will inevitably be underestimated. In a letter to *The Lancet* she points out that atom bomb survivors were only followed up five years after the explosions. Not only did their position in relation to the blast have to be accepted on trust, but the radiation doses had to be calculated from unrepresentative atom bomb tests in the Nevada desert, using models with monitoring devices. Since many infection-sensitive members of the original Hiroshima and Nagasaki populations would have died from diseases such as pneumonia, agranulocytic anaemia and radiation burns well before any cancer manifested itself, it was clear that any study of survivors would be heavily biased in favour of a low cancer count. As it happened atom bomb survivors continued to have increased death rates from non-cancers for at least fifteen years after the blasts, thus reinforcing Stewart's conclusions based on her work with childhood cancers.

Those at Hiroshima and Nagasaki at the time of the explosions were not the only victims of the radiation. Over 40,000 people entered Hiroshima after the bombing, for rescue work or in search of relatives. They were exposed to gamma radiation absorbed in the soil and buildings by neutrons emitted by the bomb and, to a lesser extent to radiation from fall-out. Several research workers have reported a significant increase in the incidence of leukemia among such people. Professor Joseph Rotblat has recently estimated the doses received by individuals who entered the city within the first three days.

There were forty-five cases of leukemia among the 25,789 persons who entered Hiroshima then, and nine cases among the 18,328 persons who entered during the following twelve days. Rotblat has assumed that the latter group received zero doses, and has therefore used it as a control group for the early entrants. He finds that the incidence of leukemia is an order of magnitude higher than that assumed by the IRCP in its latest pronouncement. Is it really pure coincidence that Rotblat should independently come up with figures that fit in with the Mancuso study?

What the industry fears

If the Mancuso study is accepted in the United States it will have enormous repercussions both there and in Europe. Critics of the present exposure limits are calling for a reduction from 5 rads a year to half a rad. Such ten-fold lowering of the limit would alter the economics of operation beyond recognition. A reduced limit would mean an enormous added expense for shielding and automation of operation. It could also mean a plethora of claims for compensation from cancer victims who have been exposed to radiation within the industry. Nor are they likely to be the only claimants. As many as 160,000 men and women were exposed during nuclear tests in the Nevada desert.

And would a limit of half a rad for occupationally exposed persons really be practical? According to Professor Karl Morgan, Director of Health Physics at Oak Ridge, 'Were we to reduce the maximum permissible exposure by a factor of ten, I seriously doubt that many of our present nuclear power plants would find it feasible to continue in operation.' Furthermore it has been pointed out, on the basis of no-threshold and the linearity of the dose-response curve, that the use of ten times as many people to reduce exposure tenfold would solve nothing since the overall risk of cancer would remain exactly the same. In addition Dr. Stewart tells of her concern about the genetic effects, which may not manifest themselves now but in three generations time — especially among the relatively closed population of people living and working around a nuclear establishment, such as Windscale.

The nuclear power establishment is increasingly on the defensive as it finds itself unable to answer the criticisms of courageous scientists who will not be bullied into silence by the threat of having their grants curtailed or attempts to discredit their work. The public too has become increasingly involved in the controversy: once people find that establishment scientists and administrators are acting dishonestly by suppressing and distorting information will they continue to support them? Will they not be more willing to put their trust in those who are calling for an end to nuclear power?

There's more to Food than Eating

Nicholas Hildyard

Although food experts and nutritionists know why we need to eat, they have consistently failed to appreciate that when it comes to the choice of food, cultural and social factors are every bit as important as physical ones

In the search for new ways to feed the world traditional eating habits have generally been dismissed as the prejudiced survivals of a less enlightened age. Early in July this year, the Food and Agriculture Organisation (FAO) declared that irrational food prohibitions and preferences are the major stumbling blocks in its war against hunger, and it proposed a worldwide campaign to educate people to eat what they're told. Third World leaders, embarrassed by the insinuation that their eating habits are primitive, have wholeheartedly accepted FAO's plans. As for the nutritionists, they are delighted by the initiative; for years they have complained that if only humans were as rational as rats and other animals who choose their food for purely nutritional reasons (instead of allowing prejudice to deny them valuable food supplies and even inflict damage on their health), the world food crisis would be nearer a solution. Colin Clark, author of *Population Growth and Food Supply*, argues for instance that if we were all to adopt 'an average 1967 Japanese diet' (whatever that might be) the world could support a population of 157 billion — nearly forty times the existing level. Similar claims have been made by the extreme advocates of such unfamiliar foods as comfrey, protein produced by growing micro-organisms on organic wastes, and soya beans. By branding others' eating habits as prejudiced, however, the experts only give the lie to their own much flaunted objectivity. If the boot were on the other foot, and the Hindu they berate for not eating his cows were to demand that they eat their cats, dogs, white mice and laboratory cockroaches, their reaction would be one of predictable horror. For we too have our taboos.

Yet there is a world of difference between deprecating food prohibitions and preferences and accepting that, although irrational to members of another culture, they are wholly rational in terms of the social system that gave rise to them. Taboos are an essential element in any society, reflecting its concerns, protecting its danger points, giving expression to its basic values, and above all, preventing it from falling apart. As Kenneth Boulding puts it, 'Society's shall-nots are the fences we erect to keep people from the cliff's edge. Falling over the cliff is the worst possible method of learning about them.'

Food taboos, however, have rarely been credited with such lofty social functions, and even those who acknowledge that they are at least rational often portray them as little more than quaint examples of primitive hygiene. As long ago as 1841, S.H. Kellogg commented

that 'The idea of parasitic and infectious maladies, which has conquered so great a position in modern pathology, appears to have greatly occupied the mind of Moses and to have dominated all his hygienic rules. He excludes from the Hebrew dietary animals particularly liable to parasites; and as it is in the blood that the germ or spores of infectious diseases circulate, he orders that they must be drained of blood before serving for food.' William Robertson Smith, the Scots theologian whose classic study *The Religion of the Semites* caused much consternation among his Free Church colleagues by daring to suggest that religious ideas reflected the demands of the social system, pursued Kellogg's argument and maintained that the Jews tabooed pork because, in nomadic times, they could not keep it from putrifying in the desert heat. More recently, pharmacologists have tried to link the Mosaic dietary rules to toxicology, pointing out that those animals that are taboo are more toxic to man than those which are not. Clearly such medical materialism adds further fuel to the argument that food prohibitions are irrational, for modern technology (the refrigerator for example) renders many of them irrelevant. Many taboos do of course have a practical side to them, but as Mary Douglas, Professor of Anthropology at University College, London, observes; 'Even if some of Moses' dietary rules were hygienically beneficial, it is a pity to treat him as an enlightened public health inspector rather than a spiritual leader.'

Quite apart from anything else, pork is by no means the only food to be forbidden, and secondly it is probable that it became the dominant taboo long after the Israelites abandoned nomadism. Moreover, it would be difficult to argue that good hygienic reasons lie behind the practice, prevalent among the pastoral Dinka of Southern Sudan, of using cow's urine to disinfect their gourds and curdle their milk. But whilst such a custom makes little sense in medical or nutritional terms, it makes perfect sense in social ones — particularly when one appreciates the high esteem in which the Dinka hold their cattle. Godfrey Lienhardt, the anthropologist who first studied them, gives some examples: the Dinka perceive colour, light and shade in terms of the colours and markings of their cattle: they imitate cattle in their dances and it is considered the height of elegance and grace to stand with one's arms outstretched so that they look like the curved horns of an ox; when boys reach manhood they are named after the colour of a cow; there is thought to be a binding contract between a man and his beasts, and it is considered outrageous to kill an ox or a cow simply because

one has an appetite for meat (as distinct from eating to survive during a famine); cattle have a prominent place in the Dinka afterlife and it is believed that a cow that has been killed for no good reason and without ceremony will haunt its killers. Seen in this light, is it not likely that the custom of curdling milk with cow's urine is more symbolic than practical? A means of investing the milk with extra 'manna' or power.

Perhaps because it is not open to empirical study, the way that food is used as a social symbol has been sadly neglected. Yet as Roger Gomm points out, 'Meals are subject to rules as grammar is, and just as the spoken language carries, beside its overt meaning, messages about the social relationship between the speaker and the listener, so food can be a powerful medium of social symbolism. Consider the way in which social distance is indexed by the sorts of food we offer to different people; there are some people we would never eat with, though we may sit next to them in a public eating place. Among those we invite for meals are those for whom we prepare an elaborate and formal meal, and those with whom we share our ordinary fare.' To return to the Dinka, the way in which cattle are divided up and apportioned during a sacrifice accurately reflects the roles and statuses in their society: the neck is for the elders; the rump is for the youngest sons of all the wives of the sacrificer; the hind leg is for the sacrificer's full-brothers and half-brothers; and so on. Social relations in the industrial world are too atomised to lend themselves to such lavish symbolism, but even so we express many basic beliefs in the way in which we classify food into 'things that are good to eat' and 'things that are bad to eat'. When, for instance, the inhabitants of Luddenden, a small village in the North of England, agreed to forgo meat for a week as part of an experiment, and eat instead textured vegetable protein (a product made from soya beans and flavoured to taste like meat) it soon became clear that whilst everybody could see that it was edible, few considered it to be food. The protein substitute was rejected because it contained no blood — and thus, in the words of one villager, 'it wasn't potent'. Lack of blood meant lack of power — and that meant that it was nutritionally worthless.

Food is also singled out as a powerful symbol of social and ethnic identity. Among the Australian Aborigines — and to a lesser extent among African, South American and Amerindian tribes — certain animals are selected as *totems* which serve to differentiate social groups and statuses right down to the level of the individual. In some cases the totem is taboo, in others it is a delicacy, but in both it is an important source of ritual power, a sacred symbol to be treated with the utmost reverence. Elaborate myths surround the totems, justifying their existence and further embellishing their power. Thus the Pitjandjara, a tribe of hunter-gatherers whose tribal lands centre on Ayers Rock, a massive escarpment which rises three thousand feet above the flat central Australian desert, believe that at the beginning of the world, mythical half-humans arose from the desert, fought among themselves; committed murder, rape and adultery; and were finally transformed into the natural features of the escarpment itself. These mythical figures

founded the Pitjandjara clans, endowing each with special rights over particular sections of the rock, and a sacred totem which, if respected, would protect their offspring from the evils which had befallen their ancestors. The totems are animals common to the numerous pools that supply the aborigines with their water — the hare wallaby, the dingo, the sand lizard, the wagtail and so on — and through them, each clan is invested with a discrete identity. So too, at birth the children are given individual totems, and males and females are further differentiated through sex totems. By the end of the day, an individual has a clear 'cognitive map' of the structure of his society, the groups it is made up of, and his own place in them.

Nor is this use of food to express group solidarity restricted to the primitive world. As Roger Gomm reports 'in the black ghettos of North America, soul food has become an important and prestigious symbol of ethnic identity and eating soul food together an expression of community and sect membership. It is perhaps not surprising that Elijah Mohammed's Black Muslims set themselves apart as chosen people by adhering to dietary rules that explicitly forbid the eating of soul food items.' It is interesting to view the rise of vegetarianism — particularly among those in the alternative movement — as a similar protest; a symbolic statement of difference and a yearning for a new way of life. Once established as the emblem of a group, it is not surprising that taboo foods take on particular significance when the group is under attack. In the horrifying conditions of the concentration camps, for instance, many Jews preferred to go to the gas chambers rather than eat the pork that their SS guards tried to force upon them.

A pioneer in the study of food taboos, Mary Douglas has pushed this analysis still further, and has propounded a theory that not only explains why we taboo foods in general, but which foods are likely to be taboo. In prohibiting certain foods, she argues, we 'are imprinting upon nature, the rules and categories that are dominant in social life'. Hence any discussion of food habits without reference to society's classificatory system, and indeed its social relations, is meaningless. It is her insistence on grounding her theory in society that makes her work on the Mosaic dietary rules a breakthrough in anthropology. Her starting point is Chesterton's aphorism that 'dirt is matter out of place'. Thus if a fish bone is 'dirt' on the kitchen floor, it is because it shouldn't be there; once in the dustbin, its proper place, it is no longer offensive. The same principle applies to food prohibitions among the Ancient Israelites. To be fit for table, animals must have certain physical features; water creatures must have fins and scales; air creatures must fly or hop on the earth and have wings and two legs; land creatures must walk or hop on the land with four legs, have parted hooves and chew the cud. Those animals which are taboo are those which do not fit neatly into these categories; they are those which defy classification and destroy taxonomic boundaries. 'The pig in Leviticus,' she explains in *Self-Evidence*, 'is put into the class of abominable, unclean creatures along with the hare, the hyrax and the camel. The grounds alleged are that these creatures either cleave

the hoof or chew the cud but do not do both. In other words they don't quite make it into the class of ungulates.'

Where Douglas has the edge over other theorists is in showing that this fear of anomaly is a constant theme throughout the whole Israelite classification system; it picks on the borderline case and tags it 'abominable'. Mixed marriages, for instance, are looked down upon, both between foreigners and Israelites and between members of the twelve tribes. Foreign wives and foreign husbands, it was thought, led to false Gods and political defections. Indeed it is interesting that some biblical scholars maintain that many of the detailed rules of the Jewish dietary were elaborated during the Babylonian exile when the Pentateuch was edited by a source known cryptically as P — or Priestly Code. The thesis is an attractive one — for it makes sense that at a time of exile, the religious scholars should have been keen to emphasize those very aspects of Jewish culture that distinguished them from their Babylonian conquerors. In fact the consensus of opinion is that P is an earlier document, but the point is well made. In a society that throughout history has been persistently threatened by enemies, which has always been jealous of the integrity of its boundaries and which is fiercely proud of its culture, it is not surprising that there should be taboos on anything that symbolises the heterogeneous — that might lead to the watering-down of the Jewish culture. The concern to preserve taxonomic boundaries simply reflects the social experience of the Ancient Israelites. As Mary Douglas puts it, 'It would seem that whenever a people are aware of encroachment and danger, dietary rules controlling what goes into the body would serve as a vivid analogy of the corpus of their cultural categories at risk.'

If Douglas is correct and food is used to express such powerful social concerns, then the consequences of breaking down taboos will indeed be serious — for to do so means challenging the existing pattern of social relations in the society concerned. The corollary of her thesis is that only a society whose social relations are unstructured — and thus where there are no social boundaries to protect — will lack all taboos. Indeed it is no coincidence that new food habits are most readily accepted in cities, where groups are more mobile, traditions less fixed and social relations more fluid. Yet there is a limit to how far taboos can be undermined without incurring a backlash. Beyond a certain point, the price we pay is increased anonymity, increased uncertainty and increased instability. By destroying group boundaries, we destroy the individual's roots of identity; by disrupting social relations, we atomise society into its component parts and deprive it of its structure; by eroding taboos we erode the basis by which we judge moral and social deviance, and finally create a monument to randomness and instability. The glib notion that we can — or indeed should — manipulate other people's food habits ignores these social constraints and by doing so threatens considerable social disruption.

If there is a solution to the world food crisis, it surely does not lie in destroying cultures but rather in re-establishing them. Indeed the great irony is that

nutritionists are most needed in precisely those societies whose culture has broken down. In the industrial world, for instance, junk food has taken its toll on the health of the population and led to a whole range of degenerative diseases unknown to primitive man whose diet was unrefined, unpolluted by additives, fresher and more varied. In the Third World, endemic malnutrition is most common in just those areas that have been most influenced by western agriculture and where cash-cropping has destroyed the traditional food base. To take one of many examples; in the coffee growing areas around Mount Kilimanjaro in Kenya, the local Chaga people, drawn into the cash economy, abandoned their traditional diet in favour of foods that can be bought such as bananas, pulses, maize and yams — all of which are high in starch and low in protein. The result has been a considerable increase in the incidence of kwashiorkor. This trend is underscored by a veritable flood of reports revealing that malnutrition is more common in urban areas of the Third World than in rural ones; not only do migrants to the city find their small incomes eaten up by rent, transport, clothing and other expenses, leaving little to spend on food, but deprived of the support of their traditional culture, they are often tempted to seek prestige in frivolous Western goods. Wholesome food comes very low on their list of priorities, and their health suffers correspondingly.

In sharp contrast are those societies that are least affected by the encroaching hand of civilisation. Generations of anthropologists have testified to the wholesome diet and good health of primitive peoples. Yet their eating habits are strictly regulated by taboos. Nor is this simply because they live in such lush environments that they can afford to be fussy — both the Eskimos in Greenland and the hunter-gatherers of the world's harshest deserts maintain rigid food prohibitions. The Bushmen of the Kalahari for example taboo numerous foods, they nonetheless enjoy extremely good health — good enough, in fact, to be able to stalk animals, over considerable distances, for days on end. Nor should this be particularly surprising for these cultures are finely tuned to their environment and their eating habits reflect the most suitable diet that can be obtained without causing environmental degradation.

Far from being prejudiced superstitions, food taboos have a vital role to play in maintaining the stability of society and the psychological and physical health of its members. Professional nutritionists need to guard against that ethnocentric arrogance which is so typical of international do-gooders whose disregard for traditional culture has brought disaster and tragedy in its wake. Is it too much to ask that they at least approach with the reverence and humility that is becoming to taboos?

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New Zealand looks at her Values

On the face of it New Zealand is the most unlikely place to have spawned the world's first eco-party. By comparison with the industrial wastelands of Europe and the United States she is a paradise, seemingly without an ecological problem to her name; her environment is still largely unspoilt; her population is small; she has little industry; her wildlife is abundant; and her people enjoy a standard of living that has led to her being dubbed 'The Sweden of the South'. Hardly the most fertile constituency, one would have thought, for a political party dedicated to ending economic growth and to abandoning materialism in favour of more humanistic values. Yet in the six years since it was founded, the Values Party has risen to become New Zealand's third major political party, gaining six per cent of the vote at the 1975 general election. If that success is anything to go by, many New Zealanders are clearly worried about their long-term future, and are far from satisfied with the direction that their society is taking.

Undoubtedly it is New Zealand's land which has suffered most from European settlement. The early pioneers found a heavily forested country which they then proceeded to convert, by axe and fire, into 40 million acres of grassland. Worse still they attempted to apply agricultural methods suited to Europe's rich soils and poor climate to New Zealand's poor soils and wonderful climate. The long-term results have been disastrous; to date some 200,000 hectares have had to be abandoned as a result of poor husbandry, and have since been reclassified as marginal land. To aggravate the problem, these areas have often been taken over by forestry companies who have planted them with *pinus radiata* and other exotic trees which have tended to acidify the soil, thus further degrading it. Soil erosion is widespread in steep hill country and all the signs are that it will get worse due to a combination of deforestation, high rainfall and overgrazing. Massive applications of superphosphates and the misuse of pesticides (seven million litres of insecticide and fungicide were sprayed in 1973 and 4000 tons of poison baits dropped by air to kill

introduced vermin, namely rabbits and opossums) have affected soil fertility by radically modifying the population of soil organisms. 'First to go are the earthworms,' writes Kenneth Morris (*The Ecologist*, Sept. 1973), 'sterile hardpan results, dung and plant debris, undecomposed, lies matting on the surface... and there are few signs of life beneath.' Despite this the New Zealand government subsidizes fertilisers to the tune of 61 million dollars, and pesticides by 17 million dollars.

Further loss of land has resulted from the lack of any real land-use policy. The popularity of quarter acre housing plots has created phenomenal suburban sprawl; with only half a million inhabitants, the city of Auckland, for example, covers a larger area than some of the most populated cities in the world. And according to T.H. Warburton, author of *Our Shrinking Heritage*, 'It is estimated that of the areas in New Zealand which have been urbanised, 37 per cent are built on first class land — and they are growing at the consumptive rate of one per cent per annum.' A folly when one considers that only ten per cent of New Zealand's land is classified as being of high value for food production and that the foundation of her economy is essentially agricultural.

Indeed the very economic vulnerability of New Zealand's agriculture is causing concern. Her prosperity stands or falls with her ability to export food and import fertilisers and other inputs. Yet it is becoming increasingly difficult to judge what food-stuffs will sell best; the EEC, for instance, has radically reduced its order for butter imports from 138,000 tons in 1977 to 125,000 in 1978 and by 1980 the figure will have fallen to 115,000 tons. The same fate has befallen the cheese market; with Britain joining the EEC, New Zealand has lost the British market completely. In 1977, wool exports fell by 190,000 kilos, ten per cent down on the previous year, and the consumption of raw wool by the OECD countries fell by 8 per cent — yet the number of sheep on the farms rose by 4.5 per cent. These setbacks may be temporary — there is a possibility that Japan will become a major buyer of New Zealand mutton, providing that the mutton smell is removed from the meat! — but they illustrate the insecurity of New Zealand's economy. Add to these difficulties the rocketing fertiliser costs and one can appreciate why many farmers are beginning to reassess the basis of their industry. Indeed Professor Cartwright, an agricultural economist, argued some months ago that New Zealand's agriculture



A land of milk and honey...

is at its most critical stage since the 1930s. 'After steady growth until 1972, areas of agricultural production are declining,' he writes. 'Hill country is falling out of production and there is a low level of investment in agriculture.' He went on to predict that phosphate prices will quadruple in the next ten years, and that under such circumstances New Zealand's economy would be thrown into an unprecedented depression.

It is clear that New Zealand's future is by no means as rosy as her 'milk and honey' image would suggest. Indeed at almost every level, her seemingly secure ecological position is thoroughly deceptive. Thus, by most standards it would be difficult to label a country the size of Britain which is inhabited by only three million people as 'over-populated' — in terms of population density, the United States is twice as crowded and India sixteen times more so. But when the material consumption of each individual is analysed, the true environmental impact of New Zealand's small population becomes apparent. The average New Zealander consumes thirty times more resources than the average Asian, and the sales of consumer goods continues to rise. Between 1955 and 1970 New Zealand's population increased by 33 per cent but in the same period the sale of cars rose by 140 per cent, synthetic detergents by 480 per cent, canned fruits by 520 per cent, synthetic fibres by 1795 per cent, and air travel by 3000 per cent.

It was against this background that Tony Brunt, then a political science student, founded the Values Party. As its first manifesto, *A Blueprint for New Zealand*, put it: 'New Zealand is in the grip of a new depression, which arises not from a lack of affluence but almost too much of it. It is a depression in human values, not in the national economy but in the national spirit . . . and it is spawning a disillusionment with our society and political system that is driving our youth to protest in the streets and filling the sensitive among their elders with despair'. Too much political and social effort was being devoted to meeting the needs of the system instead of the needs of the people, claimed Brunt, and the forces of bureaucracy, technology, production and consumerism were dominating man and subjugating him to their needs. Whilst her politicians dealt with each problem piecemeal — 'tackling each new crisis by trying to patch up the existing system, each patch separate and unconnected' — New Zealand could never hope to weather the storms that undoubtedly lay ahead. What was



... Or a paradise on the brink of destruction.

needed, argued Brunt, was a new social movement that could provide a niche for the politically homeless, and implement a co-ordinated programme for radical change that would return New Zealand to economic sanity and social stability.

Brunt's message was well received. Following his launching speech, hundreds of applications for Values membership flooded in. The Party manifesto sold out almost immediately and was acclaimed as 'the sanest thing ever read', and the 'most original and controversial political party New Zealand has seen for at least a generation.' Within six months the party was strong enough to contest 42 out of the 87 seats at the 1972 general election. The candidates were all political novices with an average age of twenty-nine — the youngest being twenty-one and the oldest sixty-five. Brunt later admitted that this political inexperience caused him many sleepless nights — 'whilst the party hovered on the brink of fame, I feared that the awesome challenge of national exposure could not be met by amateurs.' In fact, the commonsense and candour of the candidates worked in their favour. One young candidate told his constituents that if elected he would probably run away, whilst another, asked a tricky question on Values economic policy, scratched his head and answered truthfully that 'we haven't thought about that one yet'. He won a round of applause — at least politics were becoming refreshingly honest. In the event, the party polled two per cent of the national vote, almost beating the then third party, Social Credit, into fourth place.

It is perhaps a measure of the Values Party's influence that a year after the election, a poll commissioned by the *New Zealand Herald* found that eight out of ten New Zealanders were willing to sacrifice some economic progress to protect the natural environment, and at least as many were prepared to forgo a higher standard of living — and even reduce their present standard — to ease the pressure on the natural environment. 'It is significant that many young people favour a lower standard of living for the sake of fewer problems,' commented the *New Zealand Herald*. 'This is a view that will have a restraining effect on New Zealand's future.'

Not that Values was without its critics. To some its members were 'idealistic extremists', 'Marxists in sheeps' clothing', 'trendy lefties'; to others they were 'secret agents of the National Party trying to split the Labour vote', 'Limousine Liberals', 'a bunch of middle class technocrats looking down from the heights of Kelburn (a suburb of Wellington) with a hopeless little Wellington mentality' and a 'green tory party after the style of Cobbett or Edmund Burke, their policies more akin to the theories of William Blake than they are to Marshall McLuhan — in short, they are twentieth century Luddites.'

In 1974, Tony Brunt stood down as Party Leader when the Annual Party Conference decided against having any centralised leadership, except in election years. The decision proved disastrous and very nearly killed the party; membership fell and people lost confidence in it as an effective political force, fearing

A Gruson Warning

Disillusioned by the French government's piecemeal approach to environmental problems and its steadfast refusal to allow any public debate on its nuclear power programme, Claude Gruson has resigned as Chairman of France's environmental think-tank.

Gruson, a highly respected economist, set up the think-tank in 1972 after he had been given the brief of assessing France's ecological problems and formulating an environmental policy. But after a dozen commissions and the publication of as many wordy reports, the group seems to have got nowhere. 'Certainly we have collected thousands of statistics but that doesn't help to solve many problems,' explains Gruson in an interview with *L'Express*. 'It is undoubtedly useful to know how much open space there is in our cities, what noise levels we are subjected to, and how badly polluted our water is, but the most important questions evade statistical analysis. We can't quantify the "quality" of life, we can only debate it.' He believes that the only way to discover what sort of future people want is to confront them with the alternatives and get them to discuss them. But if the debate is to be fruitful then the relevant information has to be made available to the public. 'That information remains firmly in the hands of the powers-that-be and they are not keen to release it.'

Gruson's campaign for more open government has not found much favour with the establishment. When his group brought out a report on the problems of nuclear waste disposal, the Government simply shelved it. The report highlighted some of the areas where the scientific community disagreed about the safety of nuclear power, and Gruson believes that it would have provided a good basis for an informed public debate. It was the Government's refusal to publish it that finally precipitated Gruson's resignation. 'It is absolutely clear that the government has no intention of letting anything get in the way of its nuclear programme. From what Gruson told *L'Express*, it appears that the Government is determined to keep the public in the dark and will do anything to stop the lid being blown off some of the nuclear industry's touchier secrets. 'From the start the establishment has tried to blind the public with statis-

tics. In fact the people of France are not so gullible: a strong opposition movement has emerged which refuses to be hoodwinked by Government propaganda.

Though undoubtedly shaken by events such as those at Creys-Malville, the Government's enthusiasm for nuclear power remains undiminished. At present it plans to build twenty-eight new nuclear power stations. Gruson is unimpressed by the argument that this headlong dash for energy self-sufficiency is necessary if France is to avoid another energy crisis. To him, such thinking is further evidence of the dangers of the Government's preoccupation with short-term issues. 'Once one starts running the country from day-to-day with no long-term strategy, certain decisions become unavoidable. One is left with no room for manoeuvre. I do not suggest that the Government should ignore the short-term; but there are two kinds of short-term decision; those that are necessary to avoid a disaster; and those that trigger off new trends whose effects are not apparent until some time in the future.'

In Gruson's view this preoccupation with the short-term has led to a piecemeal approach to environmental problems that is totally ineffective. Too many of the government's environmental programmes smack of cosmetic surgery, and there is little attempt to analyse the underlying problems that are leading the industrial world towards economic and social bankruptcy. As Gruson puts it: 'It is very nice to plant trees in Paris. But it's like giving flowers to someone in hospital. It cheers them up but it won't cure their illness.'

Gruson's greatest fear is that democracy will not survive in our technological age. 'Technology now operates outside any political control in such a way that vast changes are imposed upon us that are often impossible to reverse. Politicians are powerless because they lack the technical information to make decisions or to contest those that have already been taken, and scientists cannot control technology because their knowledge is so fragmented. The world has embarked on a course that is totally out of control, and under such circumstances democracy is no longer possible.' It's a stern warning. One hopes that Gruson's colleagues will heed it.

Source *L'Express* 3.7.78.

its decline into little more than a watchdog organisation. By 1975, the decision had been rescinded and Dave Woodhams was elected Chairman. 'Our organisation was totally inadequate for the task of serving a decentralised democracy' he commented. Woodhams hopes that today's active membership of 500 (out of a total membership of 2000) will rise to some 5000 by 1984 (drawing from a total membership of 20,000 to 30,000). He does not consider that an over-optimistic figure for, as he points out, over 83,000 people voted for the party in 1975 when it fielded candidates in all 87 seats.

Local community politics is an essential element in the Party's overall strategy, and between elections it has been active in initiating campaigns that have kept it in the public eye. In 1976, for example, it was a major force behind *Campaign Half Million* — an attempt to get half a million people to sign a petition against nuclear power. It was Values that called the original meeting of all interested groups urging that an umbrella body be formed to co-ordinate opposition to nuclear power. That meeting resulted in the formation of Non-Nuclear Futures, a coalition of groups that specifically excluded political parties. It is a measure of its political maturity that Values was prepared to withdraw from a formal alliance with NNF, despite its initiating role, and yet at the same time encourage its members to take an active part in the campaign. In the event, *Campaign Half Million* succeeded in forcing the government to recommend a ten year moratorium on the development of nuclear power, (see *The New Ecologist* Jan/February 1978).

As New Zealand warms up for another General Election in November this year, the Values Party, having for six years defied predictions that it would collapse, will be put to the test again, more mature and experienced. It has emerged as a formidable political force and a focus for numerous groups seeking a saner and more humane future for New Zealand. In the 1975 elections, Values concentrated on a predominantly rural programme. Today, to judge from its pre-election pamphlet *Critical Issues*, it is aiming its main attack on social problems. One hopes that this tactic will prove equally successful.

Katherine James

Contact for NEW ZEALAND VALUES PARTY: *The International Secretary, P.O. Box 137, Wellington, New Zealand.*

Minamata's twelve lost years

The confused and disturbing history of Minamata disease in Japan started between 1953 and 1956 when the first symptoms of the then unknown and unnamed illness were reported. Doctors in Minamata, worried by the severity of the symptoms and afraid that it might prove infectious, formed their own investigation team in 1956 and examined medical records of patients over the previous three years. Their findings suggested to them that the illness was local, that the indications were of chemical poisoning and this was associated with the eating of locally caught river fish. From this information it did not take them long to pinpoint the source of the trouble to pollution of the local rivers by factory waste from the Chisso Chemical Corporation's Minamata factory.

At this point their troubles began. Proving what their observations led them to suspect was exceedingly difficult. The Chisso Corporation blocked all their attempts to get information about working conditions and production processes in the factory, giving as the reason that all such information was a commercial secret. Furthermore the doctors had reached the conclusion that the metal most probably involved was mercury, but this was discounted when it was found that mercury was not included on the published list of raw materials supposedly used at the Minamata factory. This in spite of the fact that it was well known to associated industrial chemists that in two processes — hydration of acetaldehyde and synthesis of vinyl chloride — the factory was using mercury as the catalyst. These chemists were unwilling to provide proof of this, presumably because they were afraid of damaging their relation with the Chisso Corporation.

Minamata disease was also studied in the 1960s by a research team at the medical school of Kumamoto University. This team too, was unable to get vital information from the Chisso Corporation in spite of

their academic credentials, and were faced with a frustrating lack of co-operation from internationally known Japanese chemists and physicians, who not only refused to support them but openly criticised their work and sought to delay publication of their findings by drawing red herrings across their path. There is no doubt that at least some of them were handsomely rewarded for these tactics.

Evidence has recently come to light from Japan which shows the shameful extent to which the truth about the source and origins of Minamata disease was hidden from the public.

Opposition also came from the Ministry of Welfare who blocked research funds for the University team, choosing instead to set up their own multi-disciplinary group made up of researchers nominated by the Economic Planning Agency of the government. The apparent purpose of this group was to divert attention from the mercury poisoning theory by putting forward alternative theories. Little original research was done and the team fell back on evaluating the results of other researchers in the hope of exposing weaknesses that could discredit their conclusions. This organization disappeared a year after its formation, when funds ran out.

In the meantime the Chisso Corporation, supported by the Japan Chemical Industry Association set up the Tamiya Committee, another multi-disciplinary study group consisting of scientists and professors from different departments of the University of Tokyo. Like the Ministry of Welfare team their brief was to seek alternative causes for Minamata disease, thus clearing the chemical industry from blame. After about two years of study this group

too was disbanded because the results of their research were unfavourable to those who were funding the work. Neither of these multi-disciplinary teams produced one whit of evidence to refute the conclusions of the Minamata doctors or the medical team at Kumamoto University. Their main effect was to delay tragically and beyond all normal allowance for caution, the full facts about the source of Minamata disease. During the period from 1960 to 1965 it was generally believed that the disease had actually faded out, and when the Kumamoto team reported their findings at a small meeting in 1964 it attracted virtually no attention from the media and no comment from government departments.

In 1965 the question was raised once more when an illness with symptoms of mercury poisoning appeared in Niigata. Although the aetiology was comparable with that of Minamata disease, the obvious connection was not made, and the problem of isolating the cause was treated as a new one. In the following years three investigatory teams were formed. The first, organized once again by the Ministry of Welfare, after overcoming obstructions from the Ministry of International Trade and Industry, who had their own reasons for not wanting the chemical industry implicated, finally in 1967 came to the conclusion that the polluter was the Kanose factory of the Showa Denko Chemical Company. The second team was a group of lawyers who represented the plaintiffs in their civil action against that company, for compensation for damage caused by the disease. These young lawyers had very little support from the government and, since Showa Denko refused to accept the findings of the Ministry team, they were forced to produce not only legal arguments as to responsibility but also to do their own research into the scientific data.

The third group was set up by the Showa Denko Company to oppose the application for damages. They employed more than twenty scientists and engineers and were supported by the Association of Safety Engineers. The activities of this team were shrouded in secrecy; except for the evidence presented in



A victim of Minimata Disease.

court, no details of their study or of their conclusions have ever been made public, although it was rumoured that hundreds of thousands of dollars were spent in research into the accumulation of trace quantities of methyl mercury in river fish. The evidence produced in court was only that which would seem to favour the defendant company and consisted in elaborate scientific data that sought to show that there was no relationship between the Kanose factory waste and the disease. Under cross-examination much of the evidence was shown to be unsupported by original research and was too weak to hold up. As the methods of the group were exposed their representations lost credibility. Typical of the sort of evidence the court was treated to was the following exchange. A physician employed by the Company testified that the symptoms of the plaintiffs were quite different from the described symptoms of Minamata disease. "So", he said "I must conclude that these people are not victims of that disease." The plaintiffs' lawyer asked: "Did you examine any of the victims and if so what was your own diagnosis of their symptoms?" The physician replied that he had not examined any of the plaintiffs because that was not his job. "My job" he explained, "is to evaluate symptoms in the literature." Such an admission confirmed that this

extremely expensive team had done little research in the field. In fact most of their work had been carried out in the factory laboratory.

Two important points emerge from this dismal history. The first is that commercial considerations were allowed to block and delay publication of facts vital to the medical profession and the public. This was not only tolerated by the government but was contributed to by certain departments of government who were themselves involved in trying to divert attention from the truth, as were distinguished professors and scientists hired by the polluting companies.

Secondly the failure of the multi-disciplinary methodology, as it was employed in this instance, demonstrates that however impressive and however diverse the talents of the participants, multi-disciplinary research is valueless unless the team is working constructively to produce plausible hypotheses that can be tested against the known facts. Furthermore if the study group is hampered by a negative brief, in this case to obscure the obvious evidence by amassing a mountain of unrelated facts, the outcome is doomed to failure.

In the case of Minamata disease there were two study groups for whom the need to isolate the cause and source of the illness was immediate and personal, the Minamata

doctors and the lawyers representing the victims of the disease. Using simple, direct techniques, by observation in the field and by talking with the people most closely involved, both groups were able to reach substantially accurate conclusions quickly and efficiently. In spite of that twelve years were to elapse between the first appearance of the disease and the government's final admission that it was caused by eating local river fish poisoned by methyl mercury* in factory waste.

Ruth Lumley-Smith.

* Industrial discharge was largely inorganic mercury which was converted in the marine eco-system to the deadly di-methyl mercury, which concentrates in the food chain.

Sources.

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New Age Alternative

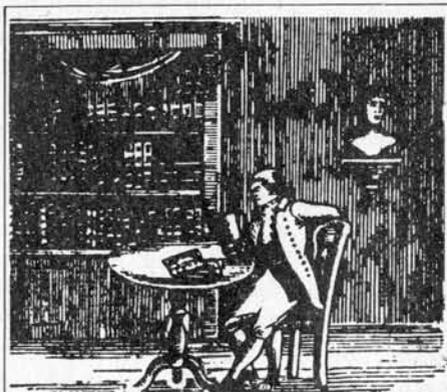
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Books

'Give us this day our daily bread . . .'

THE LAW AND THE LOAF, by Kenneth Barlow, Precision Press, 1978, 70 pp. UK price 75p.

The value of this book is certainly in inverse ratio to its size and price. Indeed, it is astonishing that the Chairman of the McCarrison Society has managed to concentrate so much information into 70 pages. Because of this, every line is important and the book has to be read, not skipped over lightly. It is one of the last links in the chain of evidence against white bread and against the British version in particular — at the moment the worst bread in Europe. At the same time it is a deadly indictment against our Government legislation, which has failed miserably to defend our daily bread or to prevent it falling from the high standards of nutrition offered by the wheat from which it is made.

The author also reviews the failure of nutritionists and other experts to follow their own advice, together with the weakness of our legislators in giving free rein to the vested interests of the monopolies concerned with the making and marketing of bread and of most of the cakes, biscuits and other processed foods of that kind to which the public are increasingly having recourse.

After an interesting summary of the history of bread from early times through the periods of the two World Wars, in which section the author avoids the temptation to copy all that has been previously written on the subject, he begins the most important and interesting part of the book. Here we find several facts, clearly stated and proved, which are

vital to anyone interested in this subject.

Dr. Barlow outlines the theory behind the phytic acid controversy, which crops up time and again as an argument against wholemeal flour. He then goes on to show the fallacy of the statement that the phytic acid in wholemeal flour is liable to prevent the absorption of calcium and thus cause rickets. The authors of this fallacy admitted their error, but as usual, the retraction did not receive the same publicity as the theory, which continues to be put forward by those who consider white flour to be more nourishing than the wholemeal variety. This is the clearest and most convincing refutation of the theory which the present writer has seen to date and it is to be hoped that it may put an end to this fallacy once and for all.

The evidence for the superiority of wholemeal flour is set out clearly within the context of the Report of the Conference on the post-war loaf (Command Papers 6701, H.M.S. O.) and the Cohen Panel in 1955. On both occasions the experts gave advice to the Government based on the fundamental principle that the advantage of natural over reinforced foods is something about which most nutritionists in the UK are agreed. To put this in simple language, the natural nutrients present in wheat should be retained as much as possible as being vastly superior to synthetic nutrients added to 'enrich' white flour. It is surely ridiculous to remove the natural nutrients and then have to put them back again in a synthetic form.

This advice was quietly set aside by those in authority on the grounds that *the representatives of industry demur!* It is not surprising, since the low extraction flour combined with the Chorleywood Process enable the manufacturers to produce a loaf at less expense to themselves, which contains more 'soft' wheat, air and water. Needless to say, the economic advantages, which are considerable, are not passed on to the housewife. In any other trade this would long ago have been called a cheap confidence trick.

However, we are all well aware of the way Big Business looks at these things. If the bread looks nice, keeps well and makes good toast, then it will sell and everyone will be happy.

Meanwhile, publicity will give the housewife the impression that she has a choice between the various 'enriched' loaves offered to her, when, in fact, there is little or no difference between them except the wrapper!

Another important section of this book is that which deals with the differences between essential nutrients as found in the natural state and the synthetic nutrients added to our foods. The importance of this subject is not always clearly understood by scientists, in spite of the fact that it is fundamental in preventative medicine. Some have claimed that food, especially white flour, enriched with synthetic additives, is just as good, if not better, than the natural foods themselves.

This is rejected by McCarrison and others, on the grounds that it is a bad approach to the problem of nutrition and that the principle on which it is based is scientifically unsound. There is no longer any doubt that certain synthetic vitamins and trace minerals do more harm than good, and that many of them are not so easily assimilated or as effective as their natural counterparts.

Our own experiments with the Vitamin B Group (especially B6) and Vitamin E have demonstrated beyond reasonable doubt that this is true, while on the other hand, the Canadian Nutritional Survey observed the same things with regard to thiamine. Scientists working in the field of plant feeding are fully aware of the fact that synthetic chemical fertilizers have one great defect in comparison with ordinary natural manure — they present plant nutrients which are devoid of humus and which are not easily assimilable. For the same reason the iron added to white flour has little or no real value because it is not presented in a form which is perfectly assimilated.

It is to be hoped that this small book will be read by everyone who is interested in health and nutrition. Its low cost makes it available to all, and if it brings a blush of shame to the cheeks of vested interests, so much the better!

David L. Greenstock.

Suntouched

EARTH WATER WIND AND SUN, D.S. Halacy, Harper & Row Ltd 1978 £4.95.

PRACTICAL SOLAR HEATING, K. McCartney with B. Ford, Prism Press Ltd 1978, £1.95 (paper).

Until very recently books skimming the surface of the renewable energy subject area have been about all there is, treating the renewables as 'gee whiz' subjects, and presented in an obligatory condescending way. Halacy's book fits very strongly into this mould, making it ideal reading for the retarded 16 year old with parents or relatives dotting enough to lash out nearly £5 on a mish-mash of half and quarter truths.

Perhaps the problem with renewable energy sources is that they are the *alternatives* to nuclear power. Well, Halacy gets rid of this problem by glowingly presenting clever wheezes whereby the atom can get a piece of the renewable action. Geothermal energy, for example, could use 'a 10-kiloton blast every ten hours' in the 'Pacer' project,

where a nuclear-blasted underground cavern is repeatedly heated by nuclear explosions; Halacy rounds off this cute possibility by informing us: 'Not surprisingly Pacer sends environmentalists climbing the walls (sic)'. If they did this enough, and lifted weights while so doing, there might be just one more renewable energy source here — and Halacy would be able to work out how many foot-pounds of energy the environmental lobby represents. Yet another great possibility he recounts, is for the Qatara Depression in Egypt, 17000 sq miles in size, and 50 miles from the Mediterranean, to be filled with water by — of course — a nuclear-blasted canal. When the new lake loses 650 cubic metres of water per second by evaporation it will just balance inflow, and turbines can generate 4000MW. You want more?

The book by McCartney and Ford is in an altogether different genre, the practical details of predominantly low-cost solar water heating. When they do try to move outside this area the results are a little incompetent, for example the title

of OPEC is re-defined as the 'Oil Export and Producer Nations'. But on the technical details of building and installing solar collectors, for example by re-using junk radiators from central heating systems, they appear to have done a very competent job.

However, even here, some remarks in the book concerning the lifetime to be expected from self-built, or purchased, collectors would not have come amiss. In the very short section on the economic value of solar heating, where 'straight line' (non-discounted) figures are mostly used, a 21-year lifetime for solar panels is assumed. Yet the National Centre for Alternate Technology's test rig of several commercial and home-built collectors shows very clearly how weathering has done great damage to many collectors in the space of 3 years. In most cases this can be traced to water penetration of collectors sealed with conventional double-glazing systems, where a sharp, two-sided corner with a seam creates a small gap through which water leaks. With alternate heating,

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cooling and freezing this does no good at all to the expensive innards, the wooden baseboard, and to the thermal performance of the insulation. Yet McCartney and Ford are using exactly this type of collector case and design, although they do remark on the possibility of using fibreglass and aluminium for making the case and backing to the collector panel.

This brings up very important points, lying right outside the scope of this useful handbook for the D-I-Y enthusiast. This is that national standards for collectors are not yet in force, and that the more costly the panel the slower its investment payback. And cost cutting by industries entering an unfamiliar technology, and selling to an uninformed public, is a recipe for killing a market that — eventually — must grow.

Andrew MacKillop

Melting Moments

THE CLIMATIC THREAT, John Gribbin, Fontana Books, £1.00

After the wettest summer for ten years, two record droughts, a long sequence of dry cold springs and the disastrous winter of 1977 in the United States, it seems likely that there is something wrong with the weather. What appears to be happening is not slow warming from the 'greenhouse effect', of carbon-dioxide building up from burning fossil fuels, but something awkward and immediate, like the lump of ice in Hudson Bay that refuses to melt (*Daily Telegraph* 9.8.78).

Dr. John Gribbin (PhD. Astrophysics) is engaged in Sussex University, on research into climatic change. In his latest book on this subject, on which he is an acknowledged authority, he has succeeded in being both accurate and readable. As the planets go round the sun at varied speeds on orbits of different lengths, there are times when many are the same side and pulling the semi-liquid surface into mighty tides that cause flickers in the solar furnace and a variation in the heat we receive. Because the movement of the planets are known these flickers can be calculated into cycles according to what is known as the 'Milankovitch Model' after the Yugoslavian astronomer who dis-

covered it.

This now generally accepted modern explanation of the causes of the Ice Ages has been confirmed by core samples from both polar ice caps and many glaciers. Dr. Gribbin gives a wealth of interesting detail on the warm period about 800 to 1300 AD when Eric the Red named Greenland *Vinland* after the grapes he found growing there; and the little Ice Age from 1400 to about 1850 that gave rise to the Frost Fairs with ox-roasting on the frozen Thames in the 17th Century and ended with the Dickens Christmasses of skating and sledging. Recently, and between 1950 and 1960 particularly we have had a spell of kindly weather, now our climate is getting back to normal.

We can expect 'blocking situations' from slight Arctic cooling in which the weather gets stuck in the same pattern, with drought in Ethiopia from rain wasted in Britain, Italy and France, and even drought in Britain and Europe, not from general warming but from the disturbance of atmospheric pressure. Many factors are involved including the solar winds, and there is an excellent chapter on these. We are not due for another Ice Age for about ten thousand years.

Though it has been calculated that by the middle of the next century the average temperature will have increased by 3°C, and only a 4°C increase would melt the polar ice caps, Dr. Gribbin is optimistic. He visualises an 'Artificial Climatic Optimum' when the increase in both atmospheric dust and carbon-dioxide will counter balance the threatened mini Ice Age and banish climatic threat.

The major danger however is the Russian plan to divert a number of rivers, notably the Ob and the Yenisei, which flow into the Arctic Ocean. The intention is to make the rivers flow *backwards* into the semi-desert of the Southern Republics of the USSR. If they succeed in this intention they will increase the salinity of the Polar sea and melt both ice and perma-frost. The Human Rights we may well need in the future will be those of restraining any nation from taking action that may change global climates, without adequate scientific research and co-operation.

This absorbing book is well written with a magnificent bibliography, and perhaps the best available in climatic knowledge today. at only £1.00 This is because it is not a popularisation by a journalist who has compiled it from standard reference works, but is written by a man who has done much of the original work in this field himself, and also writes well enough to be enjoyed by the general and literate reader.

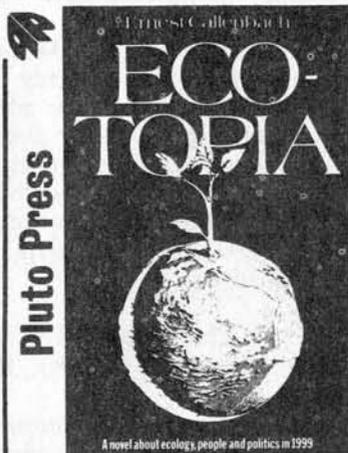
Lawrence D. Hills

Knowing your onions

PERMACULTURE ONE, Bill Mollison and David Johnson, Corgi Books \$A.4.95..

This is not a book, it is a *thesis*, written by two members of the staff of the University of Hobart, in the Department of Environmental Psychology. It is eleven inches high, eight and a half wide and three quarters thick, with many diagrams. But there are no photographs of the authors' forest farms or permaculture plantations. The reason for this curious omission is that today those who have ideas do not put them into practice for ten years — or even for two years — and then write a book based on their experience. Instead they put forward a *concept*. In *Permaculture One* the authors have done this very well.

One problem for British readers is that it is written for a milder climate than ours, and though some of the species named will grow here, there is no evidence of how well they will crop under our conditions. Although it is well arranged with many tables, almost every page includes samples of the jargon of the 'discipline' of environmental studies, which is no substitute for first hand knowledge. Consider for example the broccoli-perennial on page 104. Just why should it be more desirable to take two small crops of white sprouting broccoli in three years off a short lived sprawling perennial, then to take three good crops in three years, plus a following crop of tomatoes or sweet corn from the normal biennial variety? Consider also reedmace (*Typha latifolia*) which is our British bulrush, which supplies roots for peeling and grating raw. These have been recommended in America as



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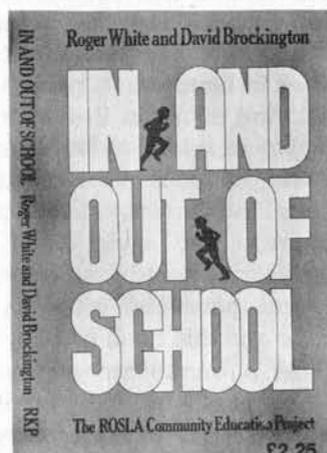
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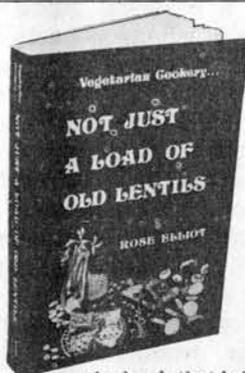


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yielding more than potatoes, but so far as I know there is no evidence that any author has ever put on thigh boots and hauled one out to cook.

As the authors say the permaculture concept has caught the imagination of hundreds of people in Australia. And it has in Britain too, but always among students and beginners in the fields of agriculture, horticulture and forestry. Unfortunately because the concept of a permanent agriculture based on tree farming and perennial crops is a fashionable one this book is likely to be used as a source for yet more books. What would be really helpful to those who want to start permaculture holdings in their own countries would be a guide written by someone with experience of this who can speak personally. Anyone who knows their onions will find in the condensed accounts in this book too much evidence that the authors have never grown these vegetables or trees.

This is a good thesis. It will interest thousands of people. But perhaps in five or ten years time one of these two young Tasmanians, with experience of the concept as it is modified in practice, will produce a really worthwhile book on the subject.

Lawrence D. Hills

Organic Dreams

THE NEW FOOD CHAIN. An Organic Link between Farm and City. Ed. Jerome Goldstein, Rodale Press £1.75.

"We must stop using city people as a scapegoat for farm problems, and rural people as a scapegoat for urban problems," writes Jerome Goldstein, and this is the linking thread in a rather uneven collection of essays. Some are inclined to too sanguine a view of the possibility of organic farming becoming widely practised in the USA. A diversion into the unreal world of the Amish Community makes 'the good life' seem within reach, but a chilling chapter by Peter Barnes on the effect of farmland takeovers by giant commercial concerns brings the reader back with a bump to harsher truths. The concluding essay by Wendell Berry is a profound and eloquent plea for a return to reverence and humility which is the only hope for a stable ecological future.

OTHER BOOKS RECEIVED

Some Good Companions. Joy Griffith-Jones, The Soil Association 50p.

A perennial cry from the would-be organic gardener is what to do about the pests and diseases that ravage our vegetables and fruits. Alternatives to the chemical spray have to be convincing, and there is nothing for it but to try them out. Companion plants in the form of mint, rue, garlic, marigolds, savory and stinging nettles all have their part to play as we learn from this well presented and charmingly illustrated booklet.

The Home Dairying Book written by the Editor and staff of Practical Self Sufficiency and published at £1.50 by Broad Leys Publishing Company.

Here is a practical guide to home dairying in all its aspects which is based on personal observation and commonsense. The beginner who relies on it will probably not go far wrong, but why I wonder does it tell us that goats must be kept indoors throughout the winter? While this may be true of some very harsh areas or of predominantly grassland holdings it is certainly not the best advice for anyone with an area of scrub or woodland, or common or moor, where winter grazing provides goats with much of the valuable roughage and variety that they need, and which contributes to their ability to keep warm. Goats are hardy healthy animals. Very good on sources for equipment and further information.

Backyard Dairy Book. Andrew Singer and Len Street, Prism Press £1.50.

An enlarged and rewritten edition of Andrew Singer's 1972 book of the same name, it is illustrated with engaging old fashioned engravings reminding one of how much prettier everything was before chrome and electricity superseded wood and elbow grease. It covers much the same ground as *The Home Dairying Book*. Both attempt to describe the process of milking through text and diagrams, but truthfully I cannot believe that anyone would be successful if they sat down to their first cow or goat with either book propped up in front of them. For your animal's sake if not for your own, do please go and learn from someone who can

give you a practical demonstration.

The Natural Food Catalogue. Vicki Peterson, Macdonald and Jane's, £5.95 or £3.95 paperback.

Ten years ago it would have been a Godsend, now this lavishly illustrated catalogue of all you need to know about organic whole foods — what they are, where to get them — how and why to use them — does not seem to add anything new to what smaller cheaper paperbacks have already covered.

Wood — The Alternative Fuel. Andrew Porteous, Hickory House Press, £1.50.

Practical advice on wood burning — its costs, its potential — types of stoves and the availability of fuel supplies, with a note on the ecological benefits.

The Book of the New Alchemists. Ed. Nancy Jack Todd, Wildwood House, £3.50.

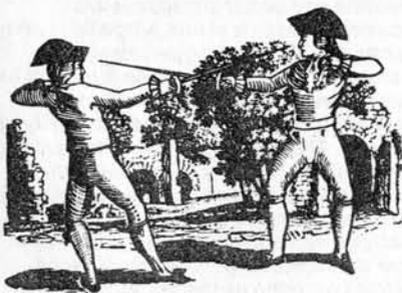
A collection from the group who make up the New Alchemy Institute in Massachusetts, it includes practical articles on self-sustaining agriculture, bioshelters, aquaculture and more. The serious text is interspersed with lots of pictures, photos of people and poems which gives it the feel of a personal scrapbook.

Ecotopia. Ernest Callenbach, Pluto Press, paperback £1.20, board £3.50.

Reviewed by Ray Dasmann in *The Ecologist* January 1977, this novel of the future now appears for the first time in the UK. A plausible if somewhat over-rosy evocation of a non-industrial society living in 1999, it is a vehicle for the author to develop theories on how such a society might come into being. Unfortunately most of its citizens are unbearable prigs.

The Environment of Man. Richard T.W. Fiennes, Croom Helm £6.95.

There are moments when technical optimism glints through the chinks of ecological sobriety. The best (and also the bulk) of this book is the author's account of the relationship between man, environment and disease, and in particular the effect on health of the urban environment.



Letters

Decline and Fall

Dear Sir,

Congratulations to Edward Goldsmith [The New Ecologist No. 3 May-June 1978] on his article 'What makes Kenny run?' It is sad that a scientist of the calibre of Professor Kenneth Mellanby should reach such conclusions in defiance of all known facts. Modern intensive agriculture puts at risk the natural fertility of the soil which is the greatest long-term asset of any farmer. Chemicals offer short-term partial rewards at the expense of the more durable qualities of good soil structure, deep rooting and continuing biological renewal. A plant requires of soil, anchorage, water and nutrients but it will acquire none of these unless it can develop a deep exploitive root system. For this the soil must also provide air. A biologically structured soil will ensure that all four requirements are satisfied. Mineral fertilisers will, at best, satisfy only part of the nutrient requirement but in doing so may inhibit achievement of the other three. The dire effects of organophosphates and chlorinated-hydrocarbons are well known.

Mark well Sir Kenneth Blaxter's article in the Farmers Weekly of 20th January 1978, to see how the Establishment is blind in its support of intensive chemical farming even if it admits that its future causes concern. No solution is offered.

The late Dr. Schumacher foretold the gradual decline and eventual end of world resources of fossil fuels and urged the Establishment to take a serious look at alternative methods of agriculture. It is obvious to anyone who understands the Tender Loving Care Factor [TLC Factor] that intensive chemical farming cannot be sustained. Surely our politicians are not so blind that they cannot see the urgent necessity for research into an alternative means of agriculture offering a degree of permanence.

Yours faithfully,
A.W. Vickers,
General Secretary,
The Soil Association,
Haughley, Suffolk.

Mis-Lead

Dear Mr. Goldsmith,

In your interesting article on Kenneth Mellanby's ecological attitudes you state: "According to Professor Bryce-Smith, Government scientists in Britain cannot

measure lead levels lower than 0.8 p.p.m." I am sorry to have to tell you that I have never said, written or even thought, any such thing.

It is true that the 1972 Ministry of Agriculture, Fisheries and Food 'Survey of Lead in Food' stated that the limit of analytical determination for lead in most U.K. fish (but not in other foodstuffs) was 0.5 p.p.m., but that appears to have been due to the use of a rather insensitive analytical procedure in one particular laboratory.

The critically serious lead pollution problem is not so much one of insensitive analytical procedures in Government laboratories as insensitive human beings in the Government machine, supine before powerful commercial interests, deaf to anything but short-term economic arguments, and blind to the greater public good.

Yours sincerely,
D. Bryce-Smith,
Dept. of Chemistry,
University of Reading.

Mr. Goldsmith tells us that he obtained the figures from an unpublished lecture of Professor Bryce-Smith's, and apologises if he inadvertently misquoted these. Ed.

The Mellanbesian Heresy

Dear Sir,

Teddy Goldsmith's attack on Kenneth Mellanby (New Ecologist No. 3, p. 77) makes distasteful reading. "Is Mellanby a Good Environmentalist?", you ask on your front cover. Four legs good, two legs bad, I suppose. The question presupposes some sort of environmental holy writ, the ecological equivalent of the Thirty Nine Articles. Does Mellanby totally and unreservedly condemn DDT, inorganic fertilisers, removing hedgerows, grazing in Australian national parks and all other works of the Evil One? No? Then he is not a Good Environmentalist. All rather reminiscent of Christians sniffing out the Albigenian heresy, or orthodox Marxists dismissing an idea not because it is wrong but because it can be labelled Trotskyist.

Scientific debate is — or ought to be — more than the marshalling of epithets. Goldsmith's technique seems to be to reduce Mellanby's arguments to absurdity, and then dismiss them as absurd. Even at this level, his case is often patently unsound. He quotes Mellanby as saying that no chemical should be used at all widely until it is proved safe, and also quotes him as saying that as a result chemicals may not be developed fast enough to satisfy demand. Then, by one of those logical leaps which readers of his editorials in the old Ecologist remember with affection, he charges that Mellanby is by implication "against imposing constraints on polluters".

I do not myself happen to agree with Mellanby's views on DDT, on fertiliser or (if Goldsmith has represented them fairly) on the Kosciuszko national park. But he does, I think, deserve better of the New Ecologist than fundamentalist abuse and repeated if not-very-subtle hints that he is in the pay of the chemical industry. He was, after all, a committed environmentalist some years before Teddy Goldsmith's Pauline conversion to the cause. Some

might even say that in terms of his training, experience, career and published work he has a better claim on the term "ecologist" even than this journal or its illustrious publisher.

Yours faithfully,
Jon Tinker,
Director, Earthscan,
London W. 1.

Shored Up

Dear Sir,

In the wake of the Parker Report fiasco it was inevitable that a movement urging civil disobedience should arise among ecopolitically concerned people. Those who suggest that civil disobedience is a threat to democracy ignore the fact that the Parker Report itself has already turned our democracy into a farce. And the Government continues to do this on other environmental issues.

For instance it was, I think, Peter Shore himself who recently stated that airport protest groups would not be allowed to influence any decisions on airport construction or siting in future. He seems to be deliberately inviting another Narita war in Britain.

It was interesting to learn of the French Government's contingency plan to have atomic workers shot should they try to escape from a nuclear site after a serious accident resulting in widespread contamination. Whether such contingency plans exist in this country, of course, I know no more than Peter Bunyard; but I do know that the guards at Windscale are permanently armed.

The threat to our democracy does not emanate from the ecological movement. It comes from a government which refuses to bow to reasoned argument, and is only willing to negotiate with terrorists, and which, by setting its face obstinately against ecological protest, is guaranteeing that ecologically concerned people will have to take to the streets — as the only form of political action left to them.

It is not, I hope, too late for some kind of political impact to be made, provided that all ecopolitical groups sink their differences to present a united front at the polls. To imagine, however, that the established political parties are amenable even to reasoned argument from the ecological groups within their own ranks, is to fool oneself. I seem to remember, many months ago, an advertisement placed in The Good Earth by SERA, in which they listed a large number of Labour MPs and Cabinet Ministers among their members. These names included Peter Shore.

Need any more be said? We must try to make an impact at the polls; but if that fails, what course other than civil disobedience will be left to us?

Yours faithfully,
Colin Fry,
Environment Information Group,
Gillingham,
Kent.

More letters on next page

Scurvy Treatment

Dear Sir,

Congratulations to Ruth Lumley-Smith on her Editorial on old age. The problem of age is to keep out of the hands of social workers and hospitals, whose cruelty in parting husbands and wives makes modern geriatric institutions vastly inferior to the alms houses of the past. The people who have always lived longest and kept their mental powers into their nineties are the farm workers and gardeners allowed by tradition to keep their cottages as long as they lived. Also by tradition they were allowed free manure from the home farm, and their diets included far more vegetables than the average household, because home-grown food made a 10s. a week pension go further.

When we investigated this some years ago we had some help from Dr. Geoffrey Taylor who investigated the health of old people in 23 Institutions and found many of them suffering from scurvy because the few vegetables in their diets were over-cooked or cooked long before they were served, thus losing fifty per cent of their Vitamin C. We designed a diet to keep up the vitamin level and thus reduce the risk of arthritis; at the same time we excluded the refined carbohydrates and processed foods. This is good nutrition for anyone, but especially for the over sixties.

So far we have given away about 35,000 copies of the diet sheet and would be glad to send them to New Ecologist readers who send a long stamped addressed envelope. This is not a vegetarian diet, but it is designed to use as much as possible of what can be grown in a garden. I am fighting fit, at sixty-seven, on a gluten free version of it [because I am a coeliac] and my wife, who devised it, is equally fit at 82. What we need is a Society for the Prevention of Cruelty to the Aged, staffed and run by the over-sixties.

Yours faithfully,
Lawrence D. Hills,
Director, Henry Doubleday
Research Association,
Bocking,
Braintree, Essex.

Not so much Sinister as Silly

Dear Sir,

Accusing the administrators, scientists and engineers of the nuclear industry of being involved in a conspiracy is similar to accusing Chamberlain and his government of conspiring with Hitler. Many of the supporters of Chamberlain were men of integrity; they were often Christians. Nevertheless despite the sincerity of their motives they were condemning us to a one way path of destruction. The final verdict is, however, that they were not conspirators; they were not guilty of a pre-meditated farce at Munich. Their offence was simpler: they were fools, as wholly out of touch with the times in which they lived as the inmates of a lunatic asylum.

Before the war the statesmen of appeasement could not distinguish between daemonic politicians and the ordinary and traditional run of calculating politicians who based their actions on strategic rational predictions. Such differences are not differences of degree

but of quality or dimension. The new dimension requires a different, more radical approach. The specialist, well trained, institutionalised mind can seldom grasp this.

Consequently I sympathise with the letter of A. N. Buckley B. SC. the Principal Scientific Officer at Windscale. He has a right to be indignant when accused of conspiracy and at having his honesty and integrity impugned. Chamberlain too, I recall, was sincerely angry and indignant. Mr. Buckley and his colleagues should only be charged with lack of imagination and intelligence. The letter betrays this lack in every paragraph. The pathetic clinging to scientific qualifications as proof of sound judgment, for instance, when we all know that nuclear physicists of the highest standing disagree about the wisdom of nuclear power stations. Does Buckley not realise that Parker himself is not a qualified nuclear physicist and therefore no more entitled to make final judgements in this field than the editorial staff of The Ecologist — who have some qualifications and can consult their own assessors in the appropriate fields? They assume, being

ecologists, that a very wide range of scientific and social disciplines are required to make a sound judgement and that Parker has the staggering and unimaginative self-assurance typical of his generation and his training, when he consents to sit in judgment on so terrifying an issue. The only explanation is that his mind is empty of the kind of vision that a scientist like Ivan Tolstoy has, for instance. We have to forgive such high minded public servants because they don't know what they are doing. Presumably some such catastrophe as the Second World War will be required to teach the run of mankind the truth. A civilisation with new values and a new outlook is not created over night, even though one would imagine the need for it could be grasped by a child. The moulds of habitual attitudes and forms of thought are only cracked by the insurmountable difficulties they cannot finally cope with.

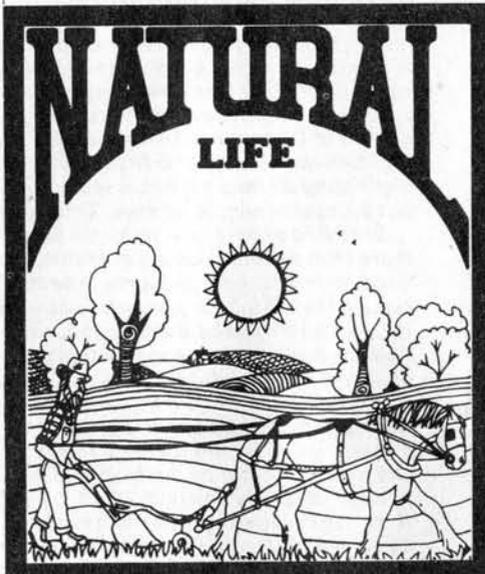
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Robert Waller,
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10.00 a.m. "Energy Perspectives for the U.K." — Leslie Grainger, chairman IEA Coal Research.
10.45 a.m. "Technology and Energy Supply" — Professor Thring, Head of Mechanical Engineering Department, Queen Mary College.
11.30 a.m. "Policy Background" — John Surrey, Senior Research Fellow, Science Policy Research Unit, Sussex University.
12.15 p.m. "The Electricity Sector and Energy Policy" — Professor Peter Odell, Erasmus University, Rotterdam.
1.00 p.m. Lunch

Session II

THE FAST BREEDER PROGRAMME

- 2.00 p.m. "The U.K. Fast Breeder Programme" — Dr. Walter Marshall, CBE, FRS, Deputy Chairman, U.K. Atomic Energy Authority.
2.45 p.m. "Differences Between Fast Breeder and Thermal Reactor Programmes" — Dr. N. Dombey, Reader in Theoretical Physics, Sussex University.
3.30 p.m. "Some Safety Considerations of the Fast Breeder Reactor" — Professor F.R. Farmer, Safety Adviser to the Atomic Energy Authority.
4.15 p.m. "Radiation Hazards, Areas of Uncertainty" — Professor P. Lindop, Professor of Radiobiology, St. Bartholomew's Hospital Medical School. Member of the Royal Commission on Environmental Pollution.

- 5.00 p.m. "The Assessment and Assumptions of Risk with Special Reference to the Fast Breeder" — Peter Taylor, Political Ecology Group, Oxford.

Session III

Friday November 24th

- 9.45 a.m. "Aspects of the Economics of the Fast Breeder" — P.M.S. Jones, Head, Economics and Programme Branch, U.K. Atomic Energy Authority.
10.30 a.m. "Comparative Study of Fast Breeder, Nuclear and non-nuclear Costs in Electricity Generation" — Michael Prior — IEA (COAL) Research) Colin Sweet — Senior Lecturer in Economics, Polytechnic of the South Bank.
11.15 a.m. "An Alternative Energy Programme" — Gerald Leach, Director, International Institute for Environment and Development.

Session IV

POLITICAL AND SOCIAL ASPECTS

- 12.00 p.m. "Plutonium and the Proliferation Problem" — Dr. Frank Barnaby, Director, Stockholm International Peace Research Institute.
Lunch
1.45 p.m. "Nuclear Power and Civil Liberties" — David Widdicombe, QC, chairman of The Administrative Law Committee of Justice.
2.30 p.m. "Decision Making and the Nuclear Industry" — Dr. Barry Shorthouse, The Open University
3.15 p.m. "Democratic Decision Making" — Professor Duncan Burn.
4.30 p.m. "The Role of Institutions in Nuclear Power" — Patrick Coyne, Editor, Energy Policy.
5.15 p.m. Conference closes.

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