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The Ecologist

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RICHARD
WILLSON

Editorial

Edward Goldsmith

Scientific myopia

The only sensible reaction to the *Blueprint for Survival* and the *Limits For Growth* is that their conclusions are obvious—painfully obvious. Anyone with average intelligence must realise that the world's population cannot increase indefinitely, that one cannot produce an infinite amount of food from a finite amount of land, that there must be a limit to the availability of fuel and mineral resources, and that we cannot expect the delicate fabric of our environment to go on absorbing ever increasing quantities of toxic wastes. In other words, present trends simply cannot be maintained, and unfortunately these trends are part and parcel of progress to which our entire society is geared.

From these considerations, it is surely not unreasonable to conclude that "progress", as we conceive it, is not the right goal for society, and that it must rapidly be harnessed to a different goal—one that is achievable without totally destroying the ecosphere of which we are an inextricable part.

Why is it then that erudite and influential people like John Maddox, Barry Commoner and Kenneth Mellanby, refuse to face these obvious facts? Why have most scientists been so slow in accepting them? Why is it also that they have failed so dismally to predict the sort of problems that it should have been quite evident we would have to face, if our society were allowed to proceed for so long in so lunatic a direction at such breakneck speed?

This is all the more puzzling when we consider that the only possible goal of science is to organise information so as to predict change in the world around us.

How then can we explain it? Perhaps scientists are just plain ignorant. This sounds unreasonable, as it is precisely the extent of their learning that is supposed to differentiate them from ordinary people. Nevertheless it is conceivable

that they might have the wrong sort of learning, and, as it happens, the more one looks into it the more plausible does this hypothesis appear.

The World, after all, or more precisely, the ecosphere, developed as a single process, which explains why its parts are so closely interrelated, yet science which purports to predict its behaviour is divided up into a host of watertight compartments. How can the expert, if his knowledge is confined to a single one of these compartments, hope to understand what is happening to the ecosphere as a whole? How can he even understand what is happening to things in his own compartment since these are constantly being influenced by things occurring in other compartments about which he knows nothing? All he can predict are those changes occurring in the totally artificial conditions of his laboratory from which extraneous factors—mainly those about which he knows nothing at all—are methodically excluded.

One is not being facetious in affirming that the expert is totally unqualified to predict the behaviour of complex systems. His training is precisely the opposite to that which would enable him to do so. Interdisciplinary research is meant to get round this problem—but is such a thing really possible? Can any research be undertaken in common by people versed in disciplines that have developed in isolation from each other, and which make use of terminologies that are largely unrelated?

Yet there is another explanation. Man, it has been said, is not so much a rational animal as a rationalising one.

In other words his conclusions are reached subconsciously and are unrelated to the explanations he offers to justify them—which are basically those that provide the most self-flattering explanation. The mechanism is well described by Vance Packard in *"The Hidden Persuaders"*. A perfect example of rationalisation is the behaviour of the unsuccessful tribal rain-maker. In trying to explain his failure, he will not incriminate the basic principles of rain-making. These are *a priori* truths, an essential part of his tribe's cultural heritage. Failure will be blamed on some technicality, such as the presence of someone who has violated a taboo. Professors Commoner and Mellanby are doing very much the same thing. They realise that our society is running into terrible trouble, but rather than at-

tribute this to the obvious fact that it is moving in the wrong direction, they prefer to incriminate various technicalities: bad planning, not enough pollution control, people using detergents instead of soap, etc. To face realities would mean accepting that the basic values underlying our industrial society are wrong, and that it is their application that is causing all the trouble. This for various psychological reasons they are incapable of doing any more than the rainmaker can question the underlying values of his tribe's cultural pattern.

Another reason for the failure of modern science is its attachment to empiricist philosophy. The latter teaches that the world behaves in accordance with our perception of it, and that knowledge can only be built up by observation and induction. As a result, scientific enterprise involves accumulating data rather than making deductions from basic principles—which people did when rationalist philosophy held sway. This leads to the custom of carrying out endless dull and repetitive experiments, with little effort to make use of the results to establish general principles, for which, if the deductive method is frowned upon, there is no requirement in any case.

When an attempt is made at interpreting data, the method used is usually very naive. It consists mainly in establishing one-way cause-and-effect relationships on the basis of empirical correlations between situations observed to have occurred together in a particular sequence. Theory is rarely resorted to to explain these correlations. What is more, these situations usually constitute a pathetically small spatio-temporal sample. When the detractors of *A Blueprint for Survival* and the *Limits to Growth* assert that there is no evidence for the social and ecological calamities that threaten us, they are simply implying that they have not so far occurred—in fact, so far so good!

If most scientists have not only failed to predict the problems we are now facing but also refuse to interpret them correctly, it is partly out of human weakness, but also because modern scientific method simply does not provide a means for so doing.

The development of a new methodology for science, one that will permit the interpretation and prediction of change in complex systems is one of today's most urgent requirements.



Why not ban DDT ?

An open letter to Norman Borlaug by Michael Allaby

Dr. Norman E. Borlaug is the architect of the Green Revolution. In 1970 he received the Nobel Peace Prize for his work in developing the high-yielding strains of cereals, especially wheat, on which the FAO agricultural development programme is based. The new varieties cannot achieve their full potential without greatly increased applications of fertiliser and pesticides and

Dr. Borlaug fears that an exaggerated concern for the environmental effects of pesticide use may lead to restrictions that will frustrate attempts to increase agricultural production in developing countries. His fears were expressed in his highly emotional, and much quoted, McDougall Memorial Lecture, delivered in Rome in November, 1971

On 8 November, 1971, you delivered the annual McDougall Memorial Lecture to the opening meeting of the 16th Governing Conference of the FAO in Rome.

The typewritten text of your lecture runs to 73 pages and 40 of them are devoted to an attack on the environmental movement. You accuse the environmentalists of many things, but

your basic grievance arises from your fear that criticism of the agricultural techniques by which food production in Europe and North America has been "industrialised" may inhibit the introduction of similar techniques in developing countries and that were this to happen the Green Revolution would fail and the world would face imminent starvation. The criticisms of these tech-

niques, in your opinion, stem from an urban society whose environment has so deteriorated that there is a nostalgic yearning, especially marked among its middle classes, for a more simple life in the countryside. This has led to a desire to construct, or reconstruct, some mythical "golden age" of farmhouse butter, wholemeal bread, golden corn swaying in the gentle summer breeze, long, cool draughts of cider and strong beer and a quality of timelessness.

Of course, no such "golden age" ever existed, at least not in our recorded history, and there may be a grain of truth in your criticism of the romantic motivation of some sections of the movement; but it is no more than a grain. You urge environmentalists to leave the farmers alone to get on with their job and to turn their attention to more serious problems of the dumping of sewage and wastes and the despoilation of the countryside in the quest for water and minerals to satisfy urban needs. I cannot speak for the environmentalists in America, but in Britain this is exactly what they are doing, sometimes very vociferously. In some ways it is a losing battle, but the enviro-

onmentalists have scored some notable victories. The environmental literature devotes more space to accounts and criticism of damage caused by urban man than it does to attacks on the farmers.

Nevertheless, you fear the power of the "environmental lobby" and you select as an example what you see as the desire to ban the use of DDT. This to you, is pure hysteria, a word you use frequently, for you know of no evidence that DDT is harmful and were it to be withdrawn from use in the developed countries you believe that the environmentalists, flushed with success, would seek to extend this ban to the developing countries. Having disrupted their agricultural and disease control programmes, they would turn to the organophosphorus compounds, the carbamates, then the herbicides, the fungicides and so on until they had banned everything. Then we could spend the brief remainder of our time on the planet discussing whether it is more inconvenient to die by starvation or by disease.

I am flattered that you should imagine we have so much power, but I feel it is necessary to explain to you why it is that we feel concern about the environment and what it is that we wish to achieve. Since you have chosen DDT, let us discuss DDT.

What about DDT?

The arch-villainess of the story is, predictably, Rachel Carson. You dismiss *Silent Spring* as a "distorted, oversimplified book of biologic half-truths". You do not mention that Miss Carson did not call for a ban on DDT. She was alarmed at the indiscriminate over-use of insecticides in the USA at that time.

DDT is persistent. When it was introduced this was considered to be one of the virtues of the organochlorines.

As a result of its persistence and its solubility in certain fats it is concentrated along food chains and has been instrumental in the reduction of populations of some predatory land birds and of marine birds which have been exposed to doses high enough to cause metabolic disorders, including changes in the physiology of egg production leading to the laying of eggs with thin shells¹. You may feel that the loss of a few species of birds is an acceptable price to pay for increased food produc-

tion, but population changes at the end of food chains may produce effects further down the chains and these may include increases in the populations of herbivorous species until they assume pest status.

DDT affects some marine organisms and molluscs and certain fish are particularly susceptible. Mackerel fishing off California had to be stopped because the fish contained residues of DDT higher than those permitted for human consumption in the USA². In developing countries marine and freshwater fish are often a significant source of dietary protein.

DDT inhibits photosynthesis at concentrations in excess of 10ppb and since the oceans act as a common "sink" for many persistent man-made substances, DDT is accumulating in sea water. It is true that DDT is highly insoluble in water, saturation being reached at 1ppb, and that it appears there is little danger of serious interference with marine phytoplankton. However, susceptibility may vary from species to species and it is possible that certain situations might lead to local concentrations. A film of oil, for example, might concentrate DDT which is fat-soluble, and oil is not an uncommon constituent of the oceans these days³. Were DDT, or DDT in combination with a synergist, to reduce phytoplankton populations, it would be undermining the base of marine life. Moreover, it has been suggested by the Swiss oceanographer Jacques Piccard that this might reduce significantly the contribution of marine plankton to the planet's atmospheric oxygen. This possibility is discounted for the immediate future, but it would seem prudent to avoid unnecessary interference with the phytoplankton.

DDT in man

DDT is distributed widely through the environment and it is found in man, although the levels stored in human tissue appear to reach a ceiling beyond which they do not rise. Amounts stored can vary widely, however, with age, sex, and degree of exposure and with climate, so that inhabitants of warm climates seem to store more than those in cooler latitudes⁴. Residues at 3ppm have been detected in Alaskan eskimos and at 1.47 ppm in non-ambulatory patients in institutions who had been fed for prolonged periods by tube on diets known to be virtually free from DDT⁵. Maximum levels of more

than 100ppm have been found in the adipose tissue of elderly non-white Americans⁶. Residues have been found in children at levels from 5.83 to 70.55ppb in two-year olds⁷. Certainly these are tiny trace amounts, but they illustrate the omnipresence of DDT.

DDT in human milk

DDT has been found in human milk. You refer to this in your lecture, dismissing fears over such small amounts. You do not say what the amounts were. Samples taken in Guatemala contained between 0.41 and 12.2 mg/kg, with an average of 3.1, and human milk in the US, Britain and Sweden has been found to contain sufficient DDT to expose infants to 0.015 to 0.02 mg/kg daily. You are right, these are very small amounts, but the recommended maximum acceptable daily intake, as defined by the WHO and FAO for DDT and related compounds is 0.01 mg/kg body weight⁸. The answer is not to end breast-feeding but to remove the DDT.

Is it harmful?

Clearly, DDT is harmful to wildlife. Is it harmful to man? At average levels of exposure it would seem not, but even this statement needs to be qualified. You quote the Surgeon-General of the USA as saying: "We have no information on which to indict DDT as a tumorigen or carcinogen for man and, on the basis of the information now available, I cannot therefore conclude that DDT represents an imminent health hazard." Compare this with the Report of the Secretary's Commission on Pesticides and Their Relationship to Environmental Health, published in 1969 by the USA Dept. of Health, Education and Welfare: "The evidence for the carcinogenicity of DDT in experimental animals is impressive and the Panel takes no exception to the conclusions as to DDT recorded in the JNCI report of the National Cancer Institute Study. *This study has demonstrated that DDT increased the incidence of cancer in mice under the experimental conditions employed. However, this does not prove carcinogenicity for human beings at the very much lower levels to which they are actually exposed.*

"Since tests with groups of laboratory animals comparable in size to large populations of humans are impractical, and because wide species differences exist, high levels of exposure are used. Whether or not this device is

adequate for extrapolation from experimental results to the human situation remains very uncertain, for research on induced cancer is replete with examples of differences in responses of different species to various carcinogens. Furthermore the metabolism of many chemicals varies with dosage level.

"Evaluation of human experience with DDT has revealed little if any evidence of long-term adverse health effects from its use. On the other hand, the observations of human experience have not been sufficient to eliminate the possibility that continued exposure may slowly induce a low level of cancer in man.

"Accordingly, with the evidence now in, DDT can be regarded neither as a proven danger as a carcinogen for man nor as an assuredly safe pesticide; suspicion has been aroused and it should be confirmed or dispelled."⁹

Thus, the evidence on carcinogenesis is at best inconclusive and at worst disturbing. Similar doubts exist regarding mutagenicity and teratogenicity. It seems likely that DDT affects the metabolism of drugs.

Who wants a ban?

The environmentalists have not demanded a ban on DDT, but the Secretary's Commission recommended that it be phased out in the USA by 1972. This recommendation was endorsed by the MIT study, *Man's Impact on the Global Environment* (SCEP), which recognised the economic significance of DDT in developing countries and recommended that the developed countries make it possible for developing countries to use more expensive substitutes, which, although pesticides are not a very satisfactory tool and eventually should be replaced completely, at least would enable them to avoid the worst of the disadvantages associated with the persistent organochlorines. So it is not the environmentalists who are demanding a ban on DDT, it is the USA Dept. of Health, Education and Welfare, supported by the MIT study, and both backed by considerable evidence. The HEW Commission studied over 5,000 references to published or current scientific research.

Would we miss it?

Were DDT to be phased out, how great would be the loss? It is known that insect populations become resistant to

insecticides by a process of selection. The HEW Report states that some 224 species of insects and acarines are now resistant to one or more group of insecticides. Of these pests, 127 are of agricultural and 97 of medical or veterinary importance¹⁰. Professor James R. Busvine, of the London School of Hygiene and Tropical Medicine, told a meeting of the FAO Working Party on Pest Resistance to Pesticides, in July, 1970, that he had verified 600 cases of resistance involving more than 100 species. In an article in the *WHO Bulletin*, Busvine and Dr R. Pal, of the Vector Biology and Control Section of the WHO, stated that malarial mosquitoes are now resistant to DDT and dieldrin in many countries where malaria is still a major problem. Yellow fever eradication programmes are being hampered by the resistance of culicine mosquitoes which are invading areas from which the disease had been eliminated. There is fear that the malarial campaign in India may have produced resistant strains of the fleas that transmit plague, which has been eliminated from most of the country.

Houseflies and bedbugs are totally resistant to DDT¹¹.

As a control measure for agricultural pests, DDT is less than perfect. By reducing populations of non-target species, including predators, it may exacerbate pest problems and may, indeed, create new pests.

Were anyone to attempt today to introduce a substance to control pests that was known in advance to be persistent, to concentrate along food chains, to affect adversely non-target organisms, including the predators of the pest itself, to lead to the appearance of resistant pest populations, to be harmful to fish, possibly to inhibit photosynthesis in marine phytoplankton and to be a possible (albeit unproven) carcinogen, mutagen and teratogen to man, he would be judged insane. Yet the environmentalists have not demanded a global ban on the use of DDT. All they have done has been to express their concern at the possible implications of the consumption of DDT throughout the world as a whole on anything approaching the scale it is consumed in the developed countries. They urge that it be phased out as quickly as substitutes can be made available. They recognise that these substitutes are more expensive than DDT and they believe that the developed countries

have a clear moral obligation to provide the finance necessary to introduce the substitutes in developing countries. In the longer term they believe that alternative methods of pest control must replace pesticides generally, for no pesticide can be wholly satisfactory.

Your lecture was a long one and it is not possible to reply to all of it in an article which, if dissolved in a solution of your lecture would produce a concentration of some 140 words per thousand. I believe you to be a man motivated by a deep compassion. You recognise, and you have said, that the growth of human populations presents us with a world food problem that can be solved only if we learn to control our numbers. You believe that the programme with which your name is so closely associated can only buy time. However, you also believe that this is the only programme that is conceivable and this leads you to a conclusion I would regard as profoundly pessimistic, for it can succeed only with the widespread introduction of agrochemicals which could lead to environmental disruptions on a scale severe enough to leave us worse off at the end than we were at the beginning.

We share your concern and your compassion, but we do not share your pessimism. We believe that there are other ways of buying time, that it is possible to produce food by stable, sustained systems of husbandry, rather than by the export of western high-technology, high-cost agriculture. Neither your way nor ours will be possible without the willing and active co-operation of the governments and peoples of the developed countries. On that we are agreed and on our analysis of the problem we are agreed. Our differences are over the strategy. Truly, you are on our side.

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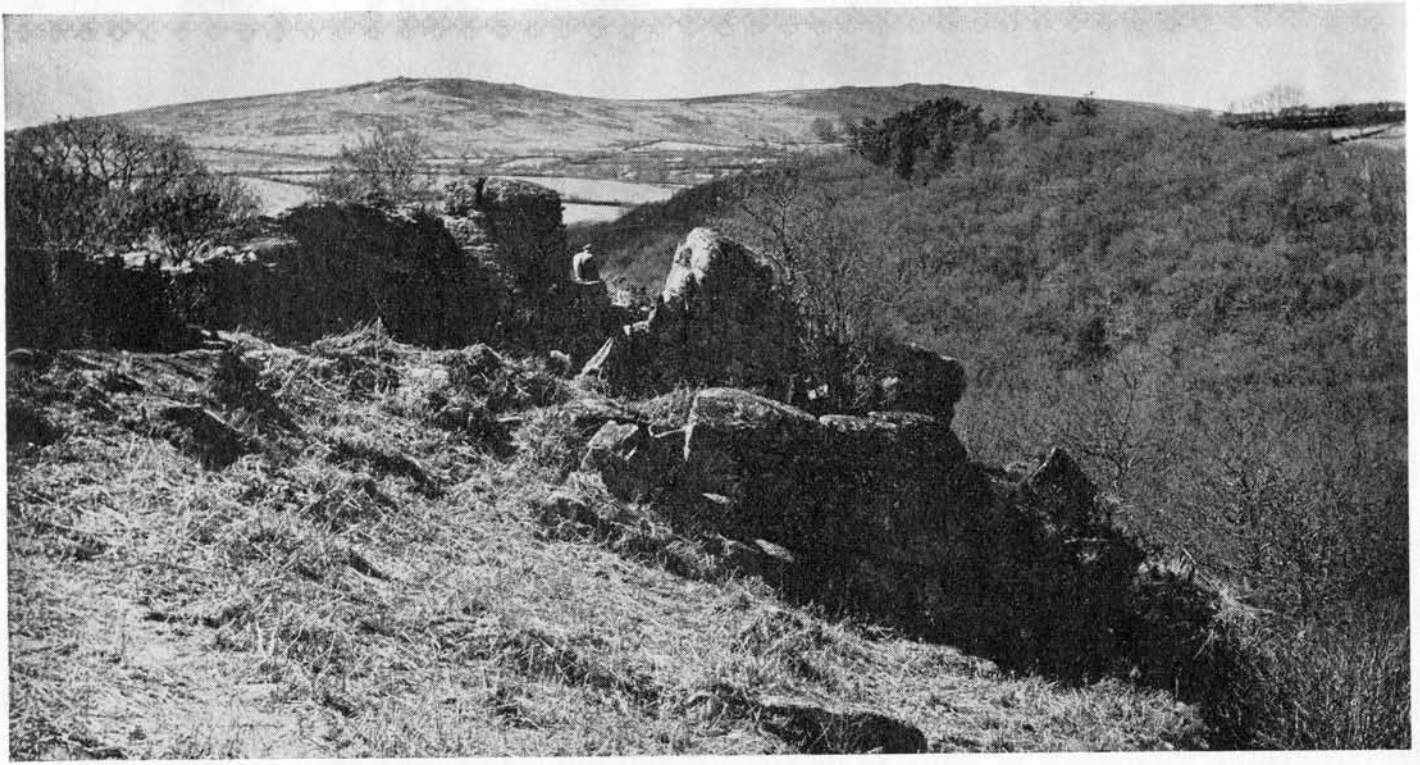
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Who are the Dartmoor Vandals?

by Raymond Anderton

Like other National Parks, Dartmoor is suffering from the intrusion of suburbia and the removal of characteristic features of the landscape. Most of the damage is done by local people and the inference is that no more effective control exists within the National Park than outside it.

A number of very disturbing features, apart from the more publicised ones concerning water, military, forestry, and clay-mining interests, are at present to be observed within the Dartmoor National Park. Not the least of them is the random destruction of hedgerow and hedgebank which appears to be being permitted.

Some of the latest of these acts, which might with justification be termed "official vandalism" if actually con-

doned by the authorities, have been perpetrated in the vicinity of Chagford, where the bank has recently been wholly removed outside the entrance to the county secondary school. In the lane beyond the Chagford swimming pool, some two hundred yards of Devon hedgebank have been removed, or reduced in height to say the least, apparently for the erection of a fence at the entrance to a new building adjoining a farm, the contractor responsible, according to the inevitable placard, being a Moretonhampstead, that is a locally situated, firm. Scenic damage is not always done by outsiders, in fact Devon's worst enemies seem to be its own inhabitants and local authorities.

At the bridge over the River Teign on that same road, near Sandy Park, a portion of stone wall has been pulled down, and in the lane from Drewsteignton to Fingle Bridge the old roadside boundary which consisted of hedgebank and stone has been destroyed near a private dwelling and replaced by a pretentious frontage of plain stone of the low wall type.

Opposite the "Anglers' Rest" at Fingle Bridge there has been a considerable excavation of the wooded hillside, presumably to accommodate motor vehicles, while a tree adjoining the parapet west of the bridge has been severely lopped leaving only a stunted stump. Farther back in the wooded approach lane similar treatment of tree branches is evident, as well as unsightly piles of cut timber, and a tatty wire netting fence stretched across a gap in the hedgebank does nothing to conceal the disorder of rubble that lies behind it.

In the Teign valley, on the road from Dunsford to Sowton Mill, a roadside cottage has for some time been undergoing renovation by another local contractor. The hedge on the Dunsford side of this cottage has been destroyed for a considerable distance, exposing untidy heaps of rubble. Indeed nothing is more remarkable than the impunity with which Devon hedgebanks are swept away whenever and wherever building operations are embarked upon. Further incursions into the hedges have

occurred in fields between Dunsford and Steps Bridge, apparently in the process of pipe-laying, and the garden hedge in front of a row of cottages almost opposite the small factory near Steps Bridge was broken into and left in a state of devastation for many weeks. Subsequently it has been made into a layby for car parking with unsightly concrete block walling.

It is now some years since road widening operations on the approach to Dartmoor proper, west of Moretonhampstead, were responsible for the disappearance of miles of drystone walling and traditional hedgerow, although the latest of these exercises, involving the destruction of a picturesque but narrow humpbacked bridge and its replacement by a wide flat bridge on a road of almost motorway proportions, was carried out only two years ago. Wooden fencing seems to be the roadside boundary most favoured by those who thus interfere with the long-established scene, the landscape and roadscape characteristics which earned Dartmoor its National Park designation. The descent from the moor towards Tavistock, from the Princetown road, is graced with similar long stretches of wooden fencing which crudely contrasts with the open moorland road, and the lower section nearer Tavistock which is still dignified by hedgebanks. This latter stretch, however, has received the attention of tree-fellers and, quite recently, at the entrance to a farm well within the National Park boundary, a short length of hedgebank was removed for private visibility purposes and replaced by concrete post and wire fencing. At the Two Bridges Hotel entrance white wooden fencing has been allowed to intrude between the traditional drystone walls which, presumably, are not considered to have any visual merits.

Suburban intrusions

These blatant suburban intrusions into a National Park are extremely disconcerting, as it is taken for granted that in such a specialised designated territory stringent control must be exerted over unsightly development. On the contrary, the evidence from Dartmoor is that more and more disruption of the natural scene is continually taking place.

On the roadside between Hound Tor and Holwell Lawn, eight groups of trees forming part of a long hedge of well-grown trees have been cut down, as

though the intention were to destroy the entire length. On the same length, the new cattle grid near Swallerton Gate is disfigured by the ubiquitous and totally needless wooden fencing, an absurdity which is proliferating in the county no less in the National Park than elsewhere, erected in this instance alongside drystone walling which is perfectly effective as a stock barrier, but to its visual detriment. It is as though the county roads department has arrived at the stage of regarding wooden fencing as a decoration that is indispensable.

This superfluous juxtaposition of wood fence against stone wall is seen at its worst at a grid near Sharpitor, on the road from Princetown to Yelverton, yet, disfiguring as it is, it does not wreak the devastation wrought by the construction of car parks. Opposite Hound Tor, such activity has entailed the dislodging of a number of huge boulders which have been left in disarray on the perimeter of the newly surfaced car park. Such new car parks on the moorland road are invariably adorned with large stones placed around their boundary, introducing an artificial, not to say arty, element into the scene. Similar stones have been placed on the verge of the moor on the Princetown road above Tavistock.

Speaking of litter . . .

For some obscure reason a litter of excavated earth and stones was recently placed against the wall of the old school at the north-eastern end of Postbridge. But speaking of litter, perhaps the worst example of it on Dartmoor is constituted by the litter receptacles themselves. Nothing more incongruous could have been conceived than these crude concrete funnels which disfigure every lay-by. It has even been thought fit to place two of them in the clearing by the West Dart at Hexworthy Bridge, a former place of beauty which is further despoiled by a pole at the bridge carrying two traffic warnings (bend and road narrows) of the pattern now liberally displayed throughout the country. Indeed the highway authority has evidently been at pains to decorate the moorland roads both major and minor with the paraphernalia of "street furniture". From Two Bridges to Hexworthy Bridge there appears a proliferation of signs warning of bends and variation in the width of the road, as though drivers in this most open of landscapes cannot see, all mounted conspicuously on poles,

regardless of their suitability to the environment. As far as the Ministry of Transport and the County Roads Department are concerned, the centre of Dartmoor is to be equated scenically with the most commonplace tract of land in the country, a mere backcloth on which to superimpose their standardised signs.

Contractors' signs

At the entrance to Prince Hall, on this moorland road, there stood supported on no less than two poles a contractor's placard proclaiming the presence of Messrs. Charles Tone & Sons of Chagford, to be left there for many weeks. A similar placard erected on the National Park boundary at Dunsford by Messrs. Ruddock & Meighan, was not removed when their digging up of the road and laying of pipes was suspended for a long period. These contractors, just for good measure, have considerably left a number of pipes at the roadside as a reminder of their activities in the area. Incidentally, what better manifestation of the standards obtaining in the National Park is to be found than here at the Dunsford boundary, where the roadside verge and the adjoining fields are divided not by hedgebanks or even wooden fencing, but by ancient iron railings of the least distinguished type.

The obvious inference to be drawn from the despoliation which is being allowed to run riot is that no more effective control is exercised within the National Park than outside it, a reflection which suggests primarily that the Dartmoor National Park Committee is singularly failing to carry out its responsibilities under the Countryside Act, whether from insensitivity to scenic deterioration or pressure from other quarters being a matter of speculation. It is however abundantly clear that the construction of reservoirs, the felling of hardwood forests, the mining of clay, the planting of conifer belts, and the training of the military are by no means the only factors having a progressively detrimental effect on the scenic quality of the moor.

The author is a freelance journalist interested in the conservation of wildlife, and has contributed to various journals, notably *'This England'* in which he has written feature articles on Westmorland and Exmoor ('Cameo of a County' and 'The Land of Lorna Doone'), and various articles for *Devon Life*, two of which concern reservoir development on Dartmoor.

Affluence and the Elderly

by W. Ferguson Anderson

It is trite saying but indeed a true one that old age is not so bad when you consider the alternative. Although the length of life anticipated by a newly born baby is much longer than at the turn of the century, people of advanced years are not living much longer. In fact Bourlière has drawn attention to the fact that in France the expectation of life of an individual of 80 years had fallen between 1805 and 1955. In 1805 a person who reached 80 years of age was indeed a "tough chicken" and had almost certainly survived typhoid fever, typhus and perhaps smallpox; thus only the very fit survived at that time. In today's world many people not so fit reach old age.

Nevertheless there has been some increase now in the expectation of life of the elderly citizen. The figures for people aged 65 years in England and Wales in 1960 were for males 12.0 years and for females 15.2 years—and those compared with 11.3 years and 13.1 years respectively in 1930.

It is not easy to interpret this increased longevity in terms of prolonged activity, i.e. in the quality of survival. Affluence, by providing adequate nursing and medical attention is possibly one factor ensuring that people who arrive in this age group are more frail and feeble than a century ago. While there are today many more old people than ever before, the greatest change is in their state of health. If present trends continue there will be more women over

75 years of an increasingly weakly type, preserved from death by their sex and their doctors. In 1967 in England and Wales there were 206,000 men between 80 and 84 years of age and 441,000 women. In 1981 corresponding figures are expected to be 247,000 and 560,000. Those 75 years and over in England and Wales will increase from 2,131,000 in 1966 to 2,725,000 in 1981, an increase of nearly one-third. Chebotarev and Sachuk revealed the comparison between the sexes in their study of 27,181 people over 80 years of age in the Ukraine (Table 1). They found nearly seven times as many women over 100 years as men, and the mortality figures from any geriatric unit will confirm the near immortality of the aged female.

TABLE I	A	B	C	Total
	80- 90	90 and over	100 and over	
Men	5,899	1,734	52	7,633
Women	13,526	6,022	363	19,548
Both sexes	19,425	7,756	415	27,181

Please note that the 100 and over in the table are taken as an isolated group ($A+B=C$).

The old men are a group with excess suicide risk, with physical illness the commonest precipitating factor, but both sexes in old age show in this modern age an ever increasing admission rate to mental hospitals. Between 1951 and 1960 mental hospital first admission rate for elderly men increased by between 30 and 40% and for elderly women by just over 40%. Munch-Petersen discussing problems relating to patients with senile dementia stated that

1.4% or approximately 1,300 elderly people in Copenhagen suffered from senile dementia and this number will probably have increased to about 1,700 in 1980.

Older people are at risk from physical disease, mental illness and social problems. There are few who would deny the need for preventive measures to overcome, among other factors, the evils of the new megapolis concept of living. There is need to separate the two great sciences of gerontology and geriatric medicine. Gerontology is concerned with the study of the process of "normal" ageing in animals or in man whereas geriatric medicine is the subdivision of medicine involved in the problems of ageing with superimposed disease.

Sick or old?

Examination of the individual from 55 years and upwards shows certain common points. Physical health is frequently neglected because symptoms of minor nature which occur are attributed to ageing and not to disease. Williamson in his survey of people over 65 years in three general practices found much unreported illness, i.e. complaints which the individual had but had not bothered to tell to his doctor, so that these troubles were unknown to anyone. Such unreported illnesses included incontinence of urine, locomotor disability, foot trouble, anaemia and dementia. On the other hand, breathlessness, swelling of ankles and paralysis of limbs if these occurred were recognised as disease.

Accurate diagnosis, important in younger age groups, is even more essential in the elderly because of failing homeostatic mechanisms and is improving with the realisation that multiple pathology is the rule and not the exception. Older people are still labelled as senile and Pritchard and Kelly analysed 98 cases referred to a geriatric unit with the diagnosis of "senility". Two-thirds of the patients were over 80 and in addition to the label "senile" a wide distribution of diagnoses was made. Some 34 patients were found with "senile" only as their diagnosis and from information available it was shown that the popular connotation of senility was built up because of the general impairment of physique, special senses and lack of social self-confidence. Seventy-two (75.5%) of patients referred were admitted and 230 diagnoses were made

in these patients i.e. 3.19 lesions per patient. Some 23 of the 72 patients admitted were discharged home, nine to eventide homes and seven remained as inpatients. Twenty-five died, and others were mainly referred to other hospitals. Eventually nearly 50% left hospital. The authors concluded "We eschew the term 'senility', preferring to rely on the honoured methods of clinical investigation. We believe that one is ill not because one is old but because there is something wrong. We also believe that the image of senility has stolen symptoms referable to disease and applied them indiscriminately to both the normal changes of senescence and to the abnormal changes of degenerative pathology conditions." A plea is made for thorough assessment of the apparently senile elderly person and that the word "senile" in isolation as a diagnosis be dropped. The question must be asked when did it become relatively unimportant in medical practice to make a diagnosis in the old. Is this a symptom of the affluent society when the young and middle-aged are regarded as the important and productive members of society?

Obesity in W. Scotland

A very common cause of ill health in the West of Scotland is obesity; this may be due to the local dietetic habits of the people. Using a monogram which by measuring height and weight gives a percentage overweight it was found that blood pressure begins to rise and the cardiac silhouette increases at around 25% overweight. These measurements were taken in women because in our series at the Rutherglen Consultative Health Centre one hundred and eleven fit fat women were found but not a single healthy fat man was discovered. Obesity may well be associated with mental ill health and in our series the common causes of emotional upset in older people were as follows: living alone, worry about physical health or the health of a loved one, bereavement and, in men, compulsory retirement.

In the pattern of modern society around 32% of people over 65 years of age live alone and many do not like it. For single or widowed women the figure rises to 50%, and approximately 26% if people over 65 have no living relatives. In an excellent debate in the House of Lords on March 23rd, 1955, Viscount Soulbury having recalled Beveridge's giants in the way of progress—disease, idleness, ignorance, squalor and want—

added a sixth, loneliness. These giants stand astride the path of progress of the elderly citizen and in this debate Soulbury quoted a letter found after the death of Robert Louis Stevenson which stated "desiderata—health, two to three hundred per year and Oh, du lieber Gott, Friends".

Loneliness, seldom seen in the bad old Glasgow tenement, seems a mark of middle-classness, almost of respectability, and perhaps of moderate affluence. In a survey of the over 80's in Stockport, Brockington and Lempert, found that 3.9% were never visited, 6.5% had no relatives visiting and 15.1% were never visited by friends. Loneliness is surely a remediable disease which would be abolished by careful planning and the help of voluntary workers. Here is the chance for the health centre with its team of doctors, social workers, nurses, chiropodists and perhaps physiotherapists. The need exists to forge links between the patient's home and the all-day club, between hospital and day hospital to ensure by one way or another ascertainment of the lonely and their continuing supervision. This supervision should include adequate nutrition, remedial exercises, provision of interests and the encouragement to stop looking in at oneself and to start thinking of others older and weaker than oneself. Loneliness, like hypothermia, is more common in the modern new building of today and our cities must be broken down into smaller communities, e.g. of 20,000 to 30,000. The older citizen becomes lost in the large town.

The need for physical examinations

Physical examination at certain periods of life, e.g. 55 years of age or following retirement or bereavement, would do much to improve the mental health of older people. At least such a procedure would make them familiar with the facilities available to them should need arise. If this was considered impracticable a start could be made in a much more restricted way. If a general practitioner with a list of 2,000 people examined each individual who became 65 years of age in the preceding year he would have to examine 16 people per year. In the 16 years' work at the Rutherglen Consultative Health Centre the improvement in the mental health of older people following a physical examination never fails to impress.

Bereavement is a time not only of mental ill health but of risk of death for the survivor and care must be taken that the older person is not lost sight of and, after an appropriate interval, is encouraged to mix again with colleagues and friends. The possession of a sound religious faith is of great value to the individual.

Compulsory retirement—a man made idle—presents no problem if he is well educated. Such an individual often finds himself busier than ever. But even in this group there are exceptions and preparation for retirement now seems the correct approach. Since 1959, the Glasgow Retirement Council has provided pre-retirement training courses and hobbies and crafts centres for those who have retired and has encouraged part-time re-employment and the formation of retired employees' associations.

In this field it would seem essential for any government to have knowledge of the labour force required in the next 25 years or so, in view of increasing automation, so that the work available may be shared and retraining programmes for part-time employment instituted at around 55 years of age. The total working life may require to be extended but the actual working hours per week greatly reduced. A place must be found in the community of tomorrow for the knowledge, ability and skill of the older worker to avoid the loss of status caused by ever earlier compulsory retirement.

The social problems of the elderly abound—financially in 1965 22.7% of married couples retired had an income of £10 to £12.10s per week, 22.3% of single men had £5–£6 per week and 42.1% of single women £4–£5 per week. In our survey work it is surprising that old people do not mention finance as a first cause of difficulty.

There is much evidence, however, of unmet social need, for example in the provision of home helps, and but for the help of relatives, neighbours and friends, the welfare and hospital services could not cope for one day. Outside hospitals and institutions there are more than three times as many old persons with severe incapacity or bedfast.

Encouragement and supply of supporting social service must be given out with hospitals and homes as even the slightest alteration in trend would swamp our inpatient resources. Every assistance should be given to relatives to enable them to help older relatives. At present in the United Kingdom 42% of

those over 67 years of age live with their children, in the United States of America 28%, Denmark 20% and Sweden less than 10%. Is this the pattern of affluence?

In contrast there is no difficulty in discharging elderly patients from hospitals in USSR. They are required immediately as baby-sitters to let the married women return to work.

In Eastern countries, for example in Singapore, there seems little incontinence in long-stay wards—there the elderly are thin, mobile and perhaps have fewer emotional problems. There seem to be in our civilisation the problems of rejection and ever increasing depression among the elderly. Newman feels that a man's behaviour patterns can be reversed by imposing intolerable strains on a normally functioning brain. He considers that the experience of prisoners of war subjected to such strains provides a plausible theory of incontinence. Under certain conditions the prisoner of war becomes indifferent to his surroundings—apathetic, dishevelled and incontinent. Newman compares this description with the condition of many old people, especially in institutions, but also in society when they are subjected as they often are to isolation, privation and humiliation. An understanding of their needs might reduce the dimensions of the problem of incontinence.

Retirement marriages

There is one cheering note in today's world: Walter McKain has written about retirement marriage. This is a new phenomenon typified by a question sent for urgent advice:

"Is there any state near Iowa where a couple can go to be married in a hurry? We would like to get married as soon as possible as his children want to put him in a rest home.

Sarah."

This book on retirement marriages is the recording of the experience of 100 older couples who married when the bride was at least 60 and the groom 65 years of age or older and only those marriages in which both partners had been married previously are reported. Among the factors which formed the basis for a successful retirement marriage were that the brides and grooms should know each other well before marrying and that the marriage should be approved by children and friends. Some individuals, according to

McKain, are so constituted that they will be happy in almost any marriage situation while others do not have the capacity for a successful marriage. If the bride and groom are satisfied with their lives up to this point and do not feel that luck has been against them they have a good chance of marital success.

The future then presents us with more frail old women, increasing admission rates among the elderly to mental hospitals, and urgent need for ascertainment of the "at risk" groups for correct diagnosis and appropriate early therapy. Nutritional advice is essential with abolition of obesity and efforts made to maintain the mental health of the elderly in the face of worry about physical health, bereavement, loneliness and retirement. Planning is necessary to make the best use of the total labour force in the most appropriate way. Unmet social needs must be met with the endeavour to support to the full all who help the ill elderly person at home. Retirement marriage offers one happy solution. Problems of the elderly are eminently soluble provided thought and money is devoted to their solution.

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The Amerindian Tragedy

by Shirley Keith

The history of relations between white Americans and the Indian nations which occupied the continent before the arrival of the first settlers is a story of deceit, betrayal, greed and misunderstanding. The white men made treaties with the Indians, broke every one of them, then declared they would make no more treaties. Indians were made American citizens, and discriminated against. Today they form the poorest, least educated, most disease-ridden section of the American nation. Yet they are on the move and a new militancy has seized them. In this article the story is summarised in order to show what it is the Indians want and need and to assess their chances of obtaining it.

I would like to thank the editors of *The Ecologist* for giving me this opportunity to write about the problems of Indian survival in Twentieth-Century America. For one thing, the editors have posed this question and given me *carte blanche* to answer it without an imposed framework. For another, they have made available a platform for the Indian point of view which is seldom heeded or respected. I hope that I can adequately communicate this point of view to a readership in a country which does not have the Indian Experience in its internal history.

There is a hidden America—a Federal shadowland—which consists of some 200 Indian reservations scattered throughout 26 states. In terms of geography, size or population, there is no such thing as a “typical” reservation. Some reserves are located in woodlands and others in deserts, some are found in badlands and others by the side of lakes. Land size varies from a few acres for the Muckleshoot Reservation in Washington to almost nine million acres for the Navaho Reservation in Arizona. The tribal populations range in number from a

handful on several of the California reserves up to more than 110,000 Navahos. Altogether, there are approximately 450,000 Indians who live on reservations or who are enrolled on the tribal lists of the Bureau of Indian Affairs, which administers Indian affairs under the Department of the Interior. In addition, there are another estimated 150,000 persons who regard themselves as Indians but are not attached to an Indian land base. The combined Indian numbers make up less than one-half of 1 per cent of the total American population.

But American Indians are a true minority in more than a numerical sense. These “first” Americans are last in terms of even the minimum definition of poverty. If the reservations differ in size and environment there is the common denominator of bad housing, lack of jobs, a high disease rate and poor education. Statistics on poverty become sterile numbers when compared to the realities of poverty, but the following facts at least indicate the material meagreness of Indian life in the midst of American plenty.

Housing is grossly sub-standard and

dilapidated for the majority of Indians. In his 1968 book about Indians, *Man's Rise to Civilization*, Peter Farb estimated that about 90 per cent of Indians live in tin-roofed shacks, leaky adobe huts, brush shelters and even abandoned automobiles. Some 60 per cent of Indian dwellings are located away from water sources, frequently more than a mile.

Unemployment rates are high and income low for Indian families. The Indian unemployment rate ranges from 40 to 80 per cent, as compared with the national rate of about 4 per cent. The average weekly income for an Indian family is \$30, or less than one-fourth the average weekly income of \$130 for other Americans.

Death for Indians occurs at an average age of 43 years, as compared with 68 years for Whites. Death from dysentery is 40 times greater among Indians than Whites, and influenza and pneumonia death rates are twice as high. There is a tuberculosis incidence of eight times the national average and wide-spread trachoma (found nowhere else in the United States) and middle-ear infections. An Indian baby has less



The Buffalo Dance.

chance of living to the age of one year than the average American has of reaching the age of 40.

Indian education is a national disgrace. The boarding school system of removing children from their parents and locating them in military-like dormitories produces not only alienation and cultural disorientation but also a suicide rate twice the national average for the same age groups; in a few boarding schools the suicide rate has been 10 times the national average. These suicides occur at such an early age as eight years. Indian children who attend white day-schools are in little better shape; while they have the advantage of living at home, they daily encounter white teachers who do not respect their traditions and white students who make fun of them for being Indian. Many schooldays end in fist-fights and broken noses. Several years ago I attended a work-shop in Seattle for Indian students who had decided to drop out of school. To a student, their reasons for dropping out were that they could not stand the daily humiliation of indifferent teachers, hostile students and textbooks which distort Indian history and denigrate Indian cultures. The drop-out rate increases through the school years, with the result that most Indian children complete only about five years of schooling. Only about 1 per cent of Indian young people enter the universities; another several per cent are qualified to attend college but cannot meet the expenses involved.

These are the broad features of

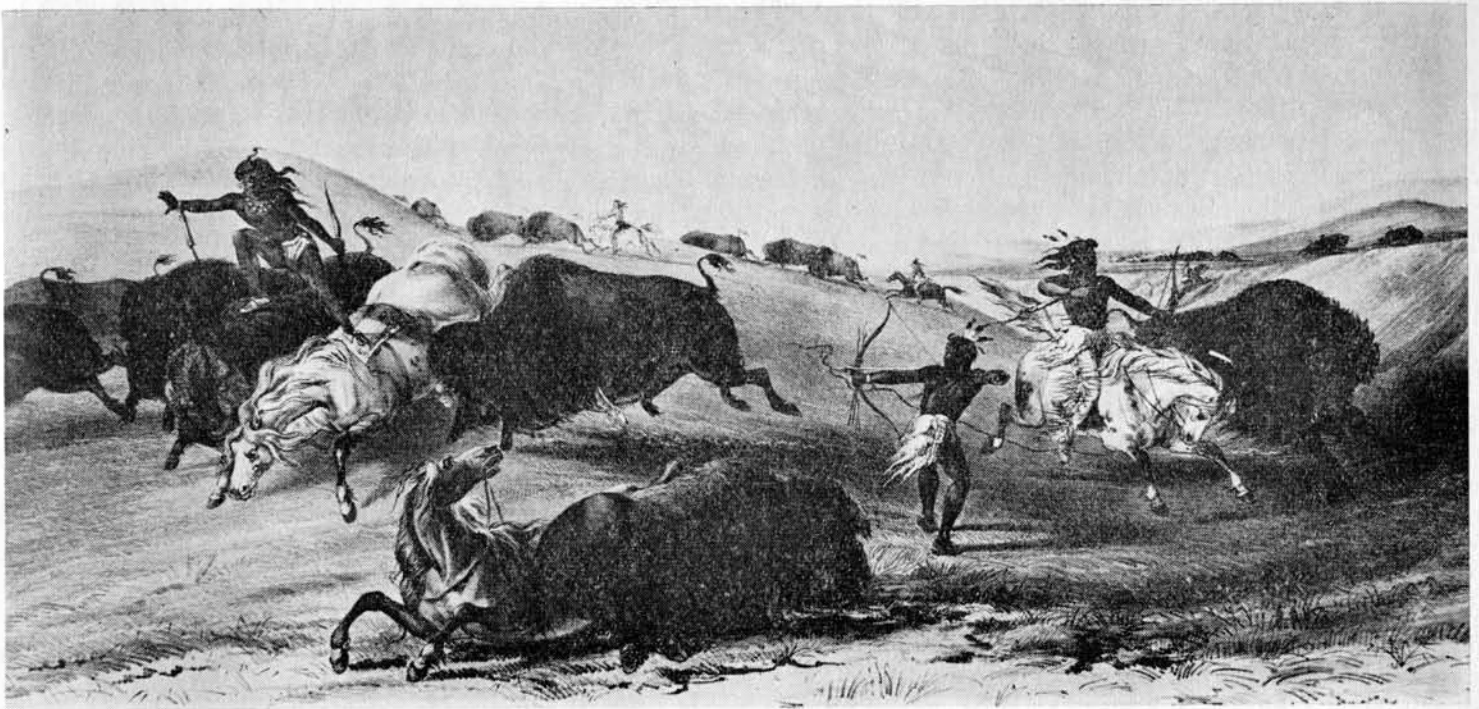
Indian poverty in the four areas which economists consider in calculating the minimal standards of well-being in America—housing, employment, health and education. These conditions constitute, as I have said, a common denominator of the various reservations and tribes. And yet, despite the appalling conditions on most reservations, Indians cling tenaciously to the remaining land base—the reservations—and resist being integrated into the dominant white society.

Why reservations?

What do reservations mean to Indians? This question is of utmost importance in considering the Indian Experience in the United States and in trying to get at the problems of the Indian future. There are other equally important questions, such as: conquest and disintegration of individual personality; the response of specific tribes to life on reservations; the long-term results of conquest and deprivation of tribal rights. These problems are massive and cumulative in their effects on Indians—so much so that they defy easy solutions or, perhaps, any solution at all. In the context of the present time an equally difficult question has to be asked: how far is the responsibility for Indian poverty due to the Indian's insistence on retaining their tribal structures and refusing to accept the white world? Does the reservation system inherently and inevitably result in poverty and economic dead-endedness? For better or worse, Indians do live on

reservations and that reality has shaped our character and our thinking about the future. Reservation life is not an ideal life style and no Indian would advocate the reservation system as the best of all possible worlds. But the reservations are all that is left of Indian land which was once an entire continent. In order to understand the Indian Experience upon which the future rests, something must be said about the relations of Indians and Whites in the past. The temptation is great to dwell upon the genocide and treachery practised by Whites against Indians; but my focus is on the reservation background of Indians and its significance for the future.

Indian reservations were created by treaties contracted between the tribes and the US Government or, less often, by Presidential Decrees and Acts of Congress. The treaty system, established in pre-Revolutionary years, was continued by the US Government as a means of dealing with hostile tribes and settling disputes over boundaries and land cessions; nearly a third were treaties of peace, with the remainder treaties of land cessions. Reservations were established as payment for huge land cessions and other tribal acts of co-operation. The tribes gave the United States land in the form of cessions, in exchange for obtaining inalienable title to the reservation areas. The United States was willing to promise that the reserves would be permanently Indian land because the treaty commissioners realised that they were



Hunting the buffalo.

making excellent real-estate bargains.

The treaties, in their essence, guaranteed to the tribes permanent and inalienable title to their lands "as long as the rivers run and the grass grows". They also guaranteed that the federal government would protect the tribes in their right of occupancy of these lands, free from interference by state and county governments and neighbouring white residents. In cases where the comparatively small reservation area left a hunting people without range enough to pursue their traditional means of livelihood, the treaties also promised compensation in the form of goods, tools, subsistence or annuities. When making treaties with the tribes, the US Government used precisely the same forms and procedures that it used in treating with other nations. Nearly 400 treaties were thus negotiated.

The *principle* underlying the treaties was that Indian tribes were sovereign nations and had to be dealt with bilaterally. The *attitude* of the US, however, was that Indians were racially and culturally inferior and that while treaties had to be made in order to obtain the land cessions, they did not have to be honoured. And true to the attitude rather than the principle, the United States has violated every treaty it made with the Indians.

Helen Hunt Jackson, in *A Century of Dishonour* (1881), examined the justifications put forward to defend the US Government's continued violation of its treaties with Indians: (1) It was absurd to make treaties with Indians in

the first place, since they were not nations or treaty-making powers; and (2) No Congress can be held responsible for the acts of preceding Congresses, or can bind subsequent Congresses.

The defect in the first of these arguments is that it overlooks the fact that the US Government treated the Indians as nations. By adopting and ratifying treaties with the Indians, the US Government itself admitted their rank among those powers capable of making treaties. Treaties made with Indians were made as with other nations and in the same way—negotiation, mutual consent, ratification.

As for the second argument, it is a principle of international law that treaties between nations never cease to be obligatory, except in cases where all treaties become invalid. All treaties contracted between nations are real treaties, according to international law and the obligations imposed by such treaties pass to succeeding administrations. The same applies to rights obtained by real treaties, such rights passing to succeeding administrations.

The United States acquired certain rights in its treaties with Indians—namely, possession of the huge tracts of land ceded by the tribes; it has indeed passed this right down through succeeding generations and administrations. But in its treaty obligations to Indians, the US Government has not only ignored international legal principles—it has wilfully violated them. Be it reiteration, let it not be

forgotten or taken lightly that the United States has never fulfilled its treaty obligations to Indians.

No more treaties

In 1871, Congress passed a rider which ended the practice of treaty-making as a means of dealing with Indian nations, although the validity of existing treaties was acknowledged. Necessarily acknowledged, it should be pointed out, since the Government needed legal justification for its acquisition of Indian lands. The same session of Congress declared: "Hereafter no Indian tribe or nation within the territory of the United States shall be acknowledged or recognised as an independent tribe or power with which the United States may contract by treaty."

The importance of the treaties for Indians is twofold. In the first place, the bilateral character of treaty-making is the foundation of Indian-White relations. Treaties are made between nations, not between a government and its citizens or subjects. Prior to 1924, when the US Congress declared that Indians were US citizens, the tribes were in a legal limbo where their treaty rights were concerned because the US neither waived its declared immunity from suit involving treaty violations, nor established a disinterested body to settle such suits, nor did it permit such disputes to be settled outside its jurisdictions. After 1924, Indians remained in a legal limbo because they were now declared to be citizens who could not bring suit as sovereign nations. The

bilateral foundation of Indian-White relations would legally prohibit such unilateral declarations as were expressed in the 1871 and 1924 Congresses, without consent of the tribes. The legal status of Indians either as sovereign nations or as citizens with treaty rights is one of the most difficult but urgent questions which must be clarified for the benefit of Indians now and in the future.

The second principal importance of the treaties to Indians is that they are the bases for Indian title and rights of possession of reservation lands. In view of the monumental thefts of reservation lands by the US Government and its citizen-settlers, this may seem like a futile issue, but it is the one legal hope Indians have for a tribal future.

Given the tribes' great concern about retaining their last lands, it may appear that Indians greedily grasp after land the way Whites do; and it may appear that ownership of real property is a driving force in Indian cultures. However, before the white conquest, Indian tribes had no concepts of private property regarding land. Harold Driver's chapter on property and inheritance in *Indians of North America* (1961) has been useful in the following discussion of land tenure of the tribes.

Land tenure patterns

The general pattern of land tenure in North America was communal control and use of territories by local groups—bands, clans, tribes or villages. An important exception to this pattern existed in the Arctic. Eskimos in the central Arctic were perhaps the most international of any North American group in their attitude toward land, i.e. any central Eskimo could hunt anywhere he chose. If a group of individuals set down a trap of some sort they would claim the trap site for a short time only and, at most, a season. There was no conception of boundaries, and when fighting occurred between Eskimos and Indians, it was never over boundary infringements but over the product that both were seeking.

Other exceptions to the general pattern of communal control of land existed among Indian groups in the Eastern Sub-Arctic, the Northwest Coast and the Oasis region in the Southwest. Where the Eskimos of the central Arctic constituted an exception with their international, i.e. open, use of land, these Indian groups were excep-

tional in their individual control of land.

The Algonquians of the Eastern Sub-Arctic recognised individual ownership of hunting territories. Such tracts were delimited by natural boundaries and trespass was punished by witchcraft and occasionally by death. It would appear that such a system was, indeed, one of private property as early anthropologists thought. However, a closer look at the Algonquian system reveals a different structure. Before the white conquest, there were co-operative hunts by Algonquian bands. Around these hunts developed a system of insurance relations between several families, i.e. a sharing of game found on the hunting territory which had been jointly allocated to these families by the band headman.

With the coming of the white fur trade, the Algonquians began to produce for trade rather than use. The economic ties within the band were transferred to white fur traders, and competition between families replaced the traditional co-operative hunting relationships. There then developed the system of individual ownership of hunting territories, but even with this new system the Algonquians retained the traditional band co-operation and while ownership of land was individual, it was not exclusive, as Peter Farb has pointed out. In the first place, the band headman performed his traditional role by allocating hunting territories to individuals (the institution of buying and selling land did not develop); the headman made the allocations on the basis of sufficiency for meeting the requirements of an individual family. Secondly, the concept of trespass applied only to persons entering another's territory with intent to obtain furs; there continued to be communal rights to the products other than furs on an individual's land—fish, berries, bark, water, etc. An individual could even enter another's territory to hunt if he were hungry, but he must turn the furs over to the owner of the land. A. J. Hallowell analysed "The Size of Algonquian Hunting Territories", (*American Anthropologist*, 1949, vol. 1) and pointed out that the size of individual land holdings remained constant because: (1) There was nothing in the economic culture to motivate the accumulation of large tracts of land; (2) There was no prestige whatsoever that accrued to individuals who hunted over

a large tract as compared to those who hunted over a smaller area; and (3) The products of the lands were a primary source of wealth rather than ownership of land in the sense of real estate.

Another apparent system of private property occurred on the Northwest Coast, where the most favourable economic sites for hunting, trapping, fishing and wildplant gathering were nominally owned by rich villagers. But this seeming individual ownership turns out to have been a sort of stewardship—the right to *direct* the exploitation of the sites. The nominal owner could not refuse permission to his village mates to use the sites. In particular, fishing sites were strictly controlled and a twenty-four hour period would be divided up so that each man could use the site, with the most productive hours reserved for the nominal owner. That the nominal owner never refused permission proves that the *use* of the land belonged to the entire village rather than to a single individual.

The last case of apparent private property occurred among the Navahos, an agricultural tribe in the Oasis region. The first person to cultivate a plot automatically acquired possession of the plot and retained ownership of it even if he later abandoned it. Boundaries were definite and the rights permanent and hereditary. But a closer look at the Navaho system reveals a communal basis of use, as with the Algonquians and the Northwest Coast Indians. First, a property-owner permitted relatives and even friends to cultivate part of the plot. Secondly, ownership applied only to the agricultural produce on the land; other resources, such as water and wild plants, were free to everyone and the entering of a field to obtain these resources did not constitute trespass. The Yuman Indians of the Oasis had a system similar to that of the Navahos but land rights were not inalienable; plots left uncultivated for several years could be claimed and cultivated by another person.

In the cases discussed above (discussed because they are apparent exceptions to the general North American pattern of communal control), it is clear that individual ownership of land was nominal and individual rights in the land limited. The communities retained certain rights in the land. In all cases, the emphasis was on the products of a site and not on the site itself.

In colonial days, before Indians realised that treaties were real-estate deals designed to swindle them out of land by promises which would not be kept, the eastern tribes signed treaties thinking that the Whites wanted to use the land for a season only. The Indians could not conceive that the settlers were there to stay permanently, with claims of ownership written on pieces of paper. The colonists, according to their lights, did recognise Indian land rights and were willing to negotiate treaties with the tribes. But the moral or natural law which Europeans cited as the basis of Indian land rights, i.e. prior ownership which could be negotiated, was itself the creation of European minds, as D'Arcy McNickle pointed out in *The Indian Tribes of the United States* (1962).

In the 1880s, the treaty-guaranteed tribal lands consisted of some 139,000,000 acres west of the Mississippi River. The tribes were beginning to recover from the shock of white conquest and from the decimation of their numbers by the U.S. Cavalry. Although they were unhappy about the imposed treaties and life on reservations, the Indians were attempting to adjust to reservation conditions. The concentration-camp atmosphere of the early reservation days, with armed guards and hand-outs of rotten food to the dependent Indians, was beginning to disappear. Federal Indian policy was shifting from a policy of conquering and subjugating the tribes to one of civilising them. To this end, the Government gave missionaries a free hand to the reservations and encouraged the Indians to become farmers. The tribes took up new farming habits and even the warrior Sioux tribes, formerly hunters and nomads, were going about the task of cultivating their reservation lands in the Dakotas. Although the missionaries succeeded in prohibiting Indian religious ceremonies and other tribal gatherings, the Indians maintained their traditional council, political structures and communal economic practices. With the guidance of the councils and the sharing of the products of the new agricultural endeavours, the Indians were beginning to recover from the great deprivation they had experienced in the early reservation days. By the 1880s, poverty among the Indians was minimal and much of the reservation lands were under cultivation.

The Indian lands, which had seemed so worthless only a short time before, now looked more desirable to white settlers. Heeding the white clamour for trivial lands, Senator Pendleton of Ohio served an ultimatum:

"They must either change their mode of life or they must die. We may regret it, we may wish it were otherwise, our sentiments of humanity may be shocked by the alternative, but we cannot shut our eyes to the fact that that is the alternative and these Indians must either change their modes of life or they will be exterminated." (Congressional Record, Volume 11; 46 Congress; Third Session 1881).

The General Allotment Act

The arguments of Senator Pendleton and his colleagues brought about the passage of the General Allotment Act of 1887 (also known as the Dawes Act, after its architect), which authorised the President to parcel reservation lands to tribal members whenever he believed that such lands might be advantageously utilised for agricultural or grazing purposes.

The avowed purpose of the Act was to give civilisation and its benefits to the Indians. Missionaries and other species enthusiastically endorsed the Allotment Act when they realised that it would "change the mode of life" of the red savages. The tribes were not being civilised fast enough; it was argued that it was not enough that they were becoming cultivators—they must be cultivators with *individual* plots of land, like white men. So the missionaries and the politicians applauded the new legislation which promised to hasten the civilisation process—by destroying Indian cultures with their different religions and languages, their tribal structures and system of communal ownership of land.

But the real purpose of the Allotment Act became apparent before many moons had passed. The Act allocated parcels of land to individual Indians, but the remaining lands—the areas not parcelled out—were declared surplus and thrown open to white settlement. Generally, of course, the "surplus" lands were the most watered and productive. Thus, in one great stroke, the Allotment Act accomplished three things: it met the demands of the white citizenry for more Indian land; it assured the politicians of votes in the next elections; and it promised to break

up the Indian tribal structures. More than 100 reservations were allotted, principally in the Plains, Pacific Coast, and Great Lakes regions.

Predictably enough, the effects of allotment on the reservations and the tribes were disastrous. First, allotted lands, as individual land holdings, were subject to state taxation, whereas original tribal land had not been. Second, the allotted acreage was usually insufficient as an economically-productive unit, and the problem increased with subsequent fractionalisation when allottees died and their lands were divided among the heirs. Third, individual land holdings could be sold—and were; many allottees sold their deeds to the white "guardians" who had been assigned to handle their affairs and found themselves homeless, never grasping what had happened to them. By 1933, two-thirds of the Indian land base of 1887 had been lost—91,000,000 acres in 46 years, and 90,000 Indians were homeless. ("Report of the Commissioner of Indian Affairs", *Annual Report of the Secretary of the Interior* 1933).

But the Allotment Act has significance beyond its impact on the reservation lands. First, prior legislation had taken some account of the cultural differences between the tribes, but the Allotment Act set an important precedent by imposing a uniform legal pattern on all Indians. Second, the Act constituted a violation of Indian-White treaty agreements in several ways: allotted lands were, in most cases, lands protected by treaties from white encroachments; the Government had obligated itself to protect the *tribe* in its right of possession and it passed over the strenuous objections of the tribes and completely disregarded the earlier principles of bilateralism which had been followed, if only nominally, in treaty-making. Third, the Act bypassed Indian tribal organisation completely and dealt with individuals, thus drastically weakening tribal government. To fill this political vacuum, the US Government expanded its involvement in Indian affairs by means of a network of laws and regulations covering every aspect of Indian life.

The Allotment Act provided that the government hold allotted lands in trust for 25 years before making the allottee the outright owner by granting him a patent in fee simple, at which time his land was put on the tax rolls and sub-



The Bear Dance

ject to alienation. As the pattern of allottee ruination became clear to even the government, it adopted a policy of automatically renewing the trust period; much of Indian land today is held under government trusteeship in this fashion. By 1920, the drastic reduction of Indian lands had made Indian poverty chronic and, above all, had left no room for an expanding Indian population. When this totally unexpected phenomenon began to develop, over-crowding on the reservations increased and poverty became acute and widespread, setting the stage for cyclical and chronic poverty. In its intent and consequences, the Allotment Act was one of the greatest acts of cultural genocide ever perpetrated by whites against Indians.

Collier's "New Deal"

The Allotment policy was reversed by the Indian Reorganisation Act of 1934. Its architect was John Collier, who served as the Commissioner of Indian Affairs during the Roosevelt administration. His "New Deal" for Indians was the first constructive federal policy towards Indians in the entire history of contact between the two nations. First, it ended the practice of allotting lands. Second, it recognised the inadequacy of the existing land base and authorized funds amounting to \$2,000,000 per year to purchase lands for the tribes. Third, it empowered the tribes to consolidate allotted lands with the consent of the allottees. The Act produced an overall increase in Indian lands from about 52

million acres in 1934 to some 57 million acres ten years later. Through the practice of constructive conservation measures provided by the Act, the value of much of that land was enhanced.

As with the Allotment Act, but in an opposite sense, the Indian Reorganisation Act had importance beyond its impact on Indian lands. It attempted, in some measure, to undo the social damage wrought by the Allotment Act; it recognised and affirmed the importance of tribal organisation for Indians; it extended to Indians some degree of influence over their own affairs; and it re-established the principle of bilateralism in Indian-White relations by becoming operative for a tribe through a majority vote of the tribal members.

John Collier reversed the totally expedient attitude which had characterised the history of governmental Indian policy. Under his tutelage, the tribes gained a lease on life. They began to focus on the future rather than on the golden limpid past which had been theirs before the Whites came with their greed and treachery. As the Indians began to re-organise along tribal and communal lines, and as the land became more productive through conservation, the widespread poverty and unemployment brought about by the Allotment Act began to diminish.

The alien concept of exclusive private property had to be imposed upon the tribes by the Allotment Act before they could comprehend it. But comprehension of an idea, forced into con-

sciousness by imposition, does not constitute acceptance of that idea. Collier saw, as no one else has seen, that Indian life is communal and tribal, and that Indian land and its resources must be under tribal control.

He spelled out his philosophy about Indian affairs in his 1947 book, *Indians of the Americas*; the essence being this: the functioning Indian is a tribal Indian, which is to say that an Indian has his identity as a member of his tribe and not as a red-skinned individual relating to other red-skinned individuals. John Collier died in 1968 but Indians will never forget him, for he was the only Commissioner who ever worked from a principle, a philosophy, an understanding of Indians and Indian ways.

But Commissioners of Indian Affairs last in office only as long as the administration which appoints them and, with the exception of John Collier, no Commissioner has ever distinguished himself by learning anything about the past. The Commissioner during the post-war years was Dillon Myer, a man of no expertise about Indian affairs, but one who had experience with minorities; as director of the War Relocation Authority during World War II, Myer had been responsible for putting thousands of Japanese-Americans in concentration camps. Under Myer, Indian policy was characterised by its usual expedient attitude; there was a progressive withdrawal of federal protection and a marked increase of state jurisdiction over Indian lands.



Hunting the grizzly bear

This policy was crystallised in 1953 with the passage of House Concurrent Resolution 108 (83rd Congress, 1st Session), which declared that federal protection should be ended as speedily as possible for the Indians of five-named states and for seven tribes located elsewhere. Senator Arthur V. Watkins, Chairman of the Senate Subcommittee on Indian Affairs from 1950-3, had this to say:

"One facet of this over-all development of Indian-White relations concerns the freeing of the Indians from special federal restrictions on the property and the person of the tribes and their numbers... By unanimous vote in both the Senate and the House of Representatives termination of such special federal supervision has been called for as soon as possible."

The hypocrisy and the honey in Watkin's phrases deserve exposure and analysis; however it is necessary here to ignore the excess verbiage and get down to the essentials of Watkins' statement and of HCR 108, which has become known as the "termination" bill. Watkins' critical phrase is: "Freeing of the Indians from special federal restrictions." Congress has allocated to itself the authority to determine when the federal government shall terminate its special relationship with an Indian group. The first step in the termination process has been the expansion of state jurisdiction over Indian affairs. But, "freeing of the Indians from special federal restrictions" goes, in reality, beyond considerations of federal vs.

state jurisdiction over the Indians. For Congress also has allocated to itself the authority to determine when the federal government shall *extinguish Indian title to land*.

John Collier had conceived of a kind of termination policy—one which would put the tribes on their feet and let them run their own affairs, with minimal governmental interference. But when Watkins spoke about freeing the Indians from federal restrictions, he wasn't talking about permitting them any measure of self-determination; he meant, in the first place, the transference of federal jurisdiction to the states and in the second place and as a logical conclusion, the termination of Indian title to their lands. The 1953 termination bill was, as Vine Deloria Jr. pointed out in *Custer Died for your Sins* (1969), a new weapon in the ancient battle for Indian lands.

Of course, no one had bothered to ask the Indians what they thought of the bill before it was passed (or even after); it was passed and presented as a *fait accompli* because no one thought the tribes important enough to have any say about their own future. When the Indians realised that the bill had the import of a "final solution" they vigorously protested, just as they had earlier protested the Indian Removal Act of 1830 (which removed all eastern Indians to the west of the Mississippi) and the General Allotment Act of 1887. But their protests fell on deaf ears, just as they had in 1830 and 1887.

The two best-known tribes affected by the termination legislation were the Klamath Tribe of Oregon and the Menominee Tribe of Wisconsin. Both tribes, it should be noted, possessed valuable timber stands. The 1953 bill was the grand-daddy bill, the foundation on which specific termination legislation for these tribes was enacted. Neither tribe had an opportunity to pass comment upon the bills which were finally rammed through Congress; both tribes were told that they must accept the legislation, sight unseen, or they could not have a distribution of the federally-held funds which belonged to them. Over the continuing objections of both tribes, the federal termination plans were carried out.

Although it is impossible to calculate fully the disastrous effects of termination on the tribal entities and on the tribal members, it is possible to show in broad terms the main results. First, the terminated tribes lost any special standing (including treaty rights) that they had had with the federal government. Secondly the tribes, as entities, were dismantled and dissolved. Thirdly the tribal lands were divided among tribal members and the tax-exempt status of those lands discontinued. Fourthly, the timber stands were sold and the proceeds distributed among the tribesmen; each Klamath Indian received about \$43,000 and, not used to a cash economy or to such large amounts of money, went on a spending spree. Fifth the individual land holdings could be sold and many were. The net result of

termination on the tribes was that they had been forcibly integrated into the white world without any knowledge of how to cope with that world. The tribesmen ended up as landless paupers with no tribal holdings to fall back on. They had, in short, been "civilised".

In view of the US Government's systematic and continuous violations of Indian treaty rights, it seems almost futile to point out that the passage of the 1953 termination bill was grossly illegal on four main counts: (1) it violated the bilateral treaty rights of mutual consent by Indians; (2) it violated the treaty guarantees of federal protection in the tribes' rights of possession; (3) it violated the treaty guarantees of federal protection from state and local encroachments; and (4) it violated the treaty confirmations of permanent and inalienable Indian title to Indian lands. But then, the nation which is currently waging war in South-east Asia under the pretext of "honouring" its commitments abroad has violated every treaty it contracted with the domestic Indian nations.

The relocation programme

Corollary to termination, the Bureau of Indian Affairs has since 1953 been promoting a Relocation programme which encourages Indians to resettle in urban areas and to give up the idea of returning to the reservations. Indians who respond to this propaganda receive financial assistance in the form of a one-way ticket out of the reservation and into the oblivion of urban poverty. Relocation provides no solution to Indian poverty—it simply adds a new dimension to the problem. Relocated Indians, with their lack of training and education, wind up in urban red ghettos either underemployed, or unemployed and living on welfare. The same situation prevails on the reservation but the newly-transplanted Indian now finds himself in an indifferent and hostile environment without family and tribe. Considering the high percentage of relocated Indians who return to the reservations, the failure of the programme must be apparent to even the Bureau of Indian Affairs. If that self-sustaining organisation would expend as much time, energy and money on the economic development of the reservations as it does on trying to relocate Indians, there would be no need for such a programme.

Since 1953, when the termination bill

was passed and the Relocation programme begun, Indians have been conditioned to expect the extinguishment of reservation lands and the disbanding of the tribal structures. The open question was not whether Indians would survive, but how long they had left. The Indians rightly felt that once again they were being pushed around by whites for the sake of expediency; first they had been pushed on to the reservations against their will and now they were being pushed out. They realised that there existed no guarantees for the survival of the tribes and that all channels for redress of Indian grievances were closed. Out of this total pessimism was born a new breed of Indians—activists who announced that they had had enough of expediency, of treaty violations, of land thefts, of stifling bureaucratic red-tape, of missionaries, of callous indifference to Indian poverty. Since all channels were closed to them, the activists put their case on the front pages—by such actions as the Washington State fishing-rights struggle and the Alcatraz occupation—in order to call attention to the certain fate of cultural genocide which awaited the tribes. The development of Indian activism was predictable enough; as V. O. Key has pointed out: "A rapid change for the worse in the relative status of any group is likely to precipitate political action." (Cited in: *Black Power*, by S. Carmichael and C. V. Hamilton, p. 58). The rapid change for the worse was the termination bill with its corollary relocation programme. The possibility that Indians could combat this "final solution" became apparent when the Black struggle began to jar white complacency and Indians saw what dramatic changes this produced. And the tribal elders largely supported the young activists because both generations have the same goal: to hold on to the Indians' last lands—the reservations—as bases on which to maintain the centuries-old tribal traditions and communalism.

Anthropologists have made contributions of great value to the study of original Indian cultures and of culture contact and change. But in the body of literature on Indians there are serious omissions regarding the refusal of Indians to give up their identity and become part of the American scene. Indeed, most anthropologists take the position, liberal and benign, that integration will happen inevitably but

enough time must be allowed for the transition to be as painless and complete as possible. I can recall very few articles and no books at all which examine a real future for Indian tribes on their own land base.

Despite centuries of conquest and generations of living on reservations, Indians are still imbued with the tribal principles of communalism. Indians may suffer from material deprivation but they view the white world as suffering from cultural and spiritual deprivation. They see the white value system as competitive rather than co-operative, as individualistic rather than communalistic, as technological rather than humanitarian. They see white elders put into old-age homes and treated as social rejects rather than as valued members of the community. They see individuals surface in the white world as "personalities" and "celebrities" rather than as leaders with wisdom and foresight.

To Indians who have never left the reservation, the white world is a strange and threatening land. Those of us who have been in that land and seen its alienation and misplaced priorities can only confirm that the white world is indeed a threatening place. Apart from his tribal identity—his Indian-ness—the Indian cannot remain an integrated personality, but the white world does not accept Indian-ness. In order to assimilate, an Indian must give up his identity and adopt the ways of whites or he can have no place in their world. Armed with this reality, the Indian task is to develop a programme and a consciousness for survival as *Indians*. There is no alternative to survival.

Abandoning the "melting pot"

The "melting pot" concept has long been debunked as a myth. This is not to say that it was perpetrated as part of a great deliberate lie. But the very premise—the equal contribution of different backgrounds to a distilled cultural blend—could never work in a country which based its economic development upon racist institutions such as slavery and coolie labour. If the concept has had any meaning at all, it was that minorities would lose their uniqueness and conform to the standards of white society. Indeed, white liberals brought this latter idea into prominence during the 1950's and insisted on establishing it as the guideline for the civil rights movement. But the

more recent movements of minority groups away from white standards and guidelines has forced America to re-examine the premises which it once comfortably assumed were at its very foundation. The real issue has become how to make pluralism a working reality. It seems to me that in a society as heterogeneous as the United States, pluralism is the only possibility for such a society to live at peace with itself and to survive. Indeed, the American myth of equal cultural contributions can be realised only in a pluralistic context.

If the idea of pluralism has only recently become an operational theme for many minorities, Indians have always firmly adhered to their tribal ways and identities. Indians did not know the meaning of poverty until they were conquered and forcibly transformed from independent nations into an American minority. Poverty is a relative matter—the condition of some proportion of a society suffering from continual deprivation of both a quantitative and a qualitative character, while another segment of the population enjoys the rewards of the society's productivity on a continuous basis. By the standards and practices of Indian communalism, everyone in the group was guaranteed food, shelter, clothing, protection and dignity, so long as the group had these things to offer. Tribal communalism frowned upon and sanctioned against the accumulation of material possessions in one family while another went without. The tribe enjoyed good times and bad—as a group; when there were good times, every member of the group shared in the benefits, and when there were bad times, everyone shared in the deprivations. Indians have always sought to live according to their own standards and not as a minority relative to white standards, nor as a group aspiring to white standards or a share of the American pie. Indeed, many Indians do not think of themselves as Americans, despite the 1924 Congressional articulation of citizenship for Indians (about which, it should be added, Congress did not ask the Indians, and about which, if asked, many Indians would have declined the honour).

Until recently, Indians asked only that they be left alone, in order to work out a tribal compromise with a past not dead and a future not predictable; in order to come to grips with the past beauty and democracy of Indian tribal-

ism and the cold reality of a diminished and diminishing land base; in order to deal with the conflict of an age-old respect for nature and for Mother Earth and the harshness of encroaching technology with its trash-heaps of indissoluble plastic and tin cans and glass jars. Until recently, Indians only wanted to be left alone by the Americans.

But the US Government has systematically strangled Indian initiative by the spider web of unilateral legislation designed to destroy the tribes and to divest them of their lands, culminating in the all-out assault by termination. The tribes were psychologically brutalised by termination, at first stunned into total apathy but later revived and moving towards a regroupment of forces and a re-articulation of aspirations. The old minimal demand of being left alone, of mere survival, is no longer enough. We want *guarantees* for an Indian future, one in which Indians will not simply survive but will thrive and flourish *as tribes*.

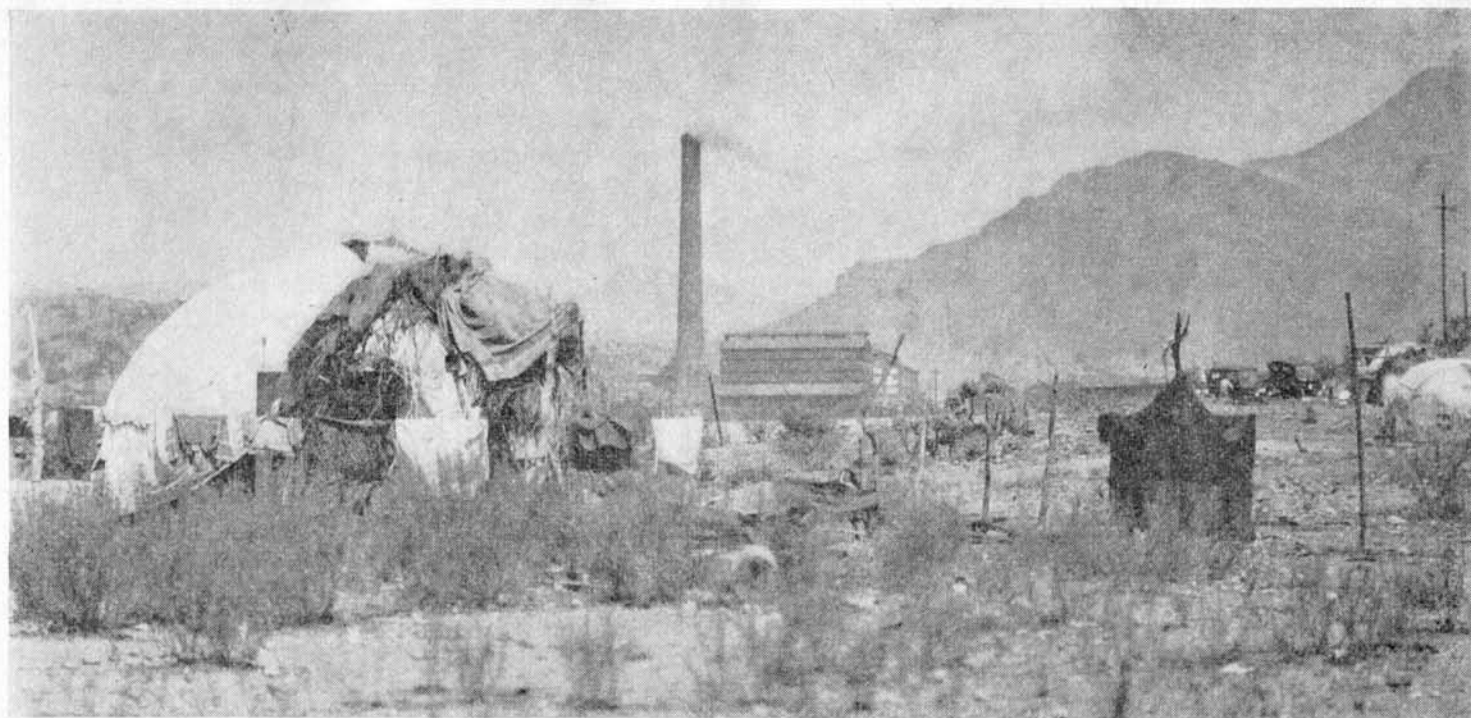
Tribal self-determination

Both as a concept and a social movement, Indian pluralism contains several discernible and significant elements. In the very first place, we intend to retain and develop our existing land base. The moral, cultural and political reasons are obvious. The United States is Indian land, after all, and the tribes had been in the New World 40,000 years before the Europeans came—since before Descartes and St. Augustine and Aristotle. Indians remain tribal, and while they can peacefully co-exist with Americans, they cannot survive among them. The economic development of our land base must be along communal lines, and far from being an idealistic day-dream or simply an adherence to old traditions, the realities of a diminished and fragmented land base dictate such a necessity. The Indian determination to regain tribal significance in daily living is a principle of existence which cannot be compromised. According to this idea, the allotted lands must be returned to the tribe for use by all the tribal members. This, of course, must be accomplished with the owner's consent; alternatives must be developed and presented through a re-education process so that the Indian property-owner will regard the transference of his allotment as a gain for the tribe rather than as a loss to himself. Com-

munity projects, co-operatives, irrigation systems, farm machinery—all such efforts must be made and implemented for the benefit of all tribal members. Indian land rights are legally premised upon the treaties which, it will be recalled, guaranteed Indian title to the reservation lands in perpetuity in exchange for the cession of almost all our original lands to the Europeans and Americans.

Another element in Indian thinking is that we want self-determination without termination. This in no way suggests a secessionist demand. We want the right of tribal determination, by tribal means, for tribal benefit. Before the Europeans arrived on our land, Indian elders had about 40,000 years of coping with the dichotomies and the problems of life and, if left alone, they can cope with the problems of conquest. The elders alone—not the whites, and certainly not government functionaries—know what is best for the tribes. For example, the Bureau of Indian Affairs has authorised itself to appoint members to the tribal councils, thereby introducing the corrupt American practices of political favouritism and payoffs in exchange for council docility and acquiescence in BIA manoeuvres and manipulations. We need wise people and warriors on the councils, and the only way this can be assured is through the traditional democratic tribal form. In traditional Indian way, individuals were on the council so long as they performed meritoriously and reflected the wishes of the tribe. With BIA system, a council member is appointed for a period of tenure, during which time he may or may not perform meritoriously, but cannot be removed until the end of the announced term. Indian self-determination must begin at the heart of the tribal structure—the council fires—and extend to economic pursuits, Indian schools, religious practices and the use of Indian language. In practice, tribal self-determination would be similar to the American system of community control of community affairs, with city councils, school boards, newspapers, etc. At the same time, Indians are under no illusions about the democracy of American communities, particularly where sociological minorities may constitute the numerical majority and still not have their voices heeded by such local institutions as school boards.

A third element in Indian pluralism



The once proud Apaches now inhabit "hogans" or shelters in the plains devastated by industrial man.

is that the tribes want to retain their relationship with the federal government. The basis of this idea lies in the treaties which are international law—made between nations. By the same token, France or England deals with the US federal government and not with state governments. For the Indian nations, this means an end to state jurisdiction over Indian lands and members of the Indian nations. It also means the right to bilateral agreement to any legislation which pertains to the tribes, to tribal members on the reservations and to the reservation lands and resources. The US Government, accordingly, must cease from making unilateral decisions which pertain to Indians, and must refrain from legislating whatever it chooses, whenever it chooses, and however it chooses, in disregard of the rights of the Indian people.

New hope from Nixon

Last year marked a turning point for Indians in the United States. On July 8, in a message to the Congress, President Nixon made a series of far-reaching recommendations for the betterment of Indians in the areas of education, land, economic development, health, urban problems, and Indian control of their resources. Indians had awaited the speech with a certain wariness, not surprising considering our past experiences with the Allotment Act and the termination bill. But wariness changed to surprise, and surprise to incredulity, when the President spoke

out strongly against forced termination on the one hand and against excessive governmental interference in Indian affairs on the other. Without pious phrases about "civilizing" the Indians, without ambiguity, President Nixon stated:

"Self-determination among the Indian people can and must be encouraged without the threat of eventual termination. In my view, in fact, that is the only way that self-determination can effectively be fostered.

"This, then, must be the goal of any new national policy toward the Indian people: to strengthen the Indian's sense of autonomy without threatening his sense of community. We must assure the Indian that he can assume control of his own life without being separated involuntarily from the tribal group. And we must make it clear that Indians can become independent of Federal control without being cut off from Federal concern and Federal support. My specific recommendations to the Congress are designed to carry out this policy."

At least one specific recommendation made by President Nixon has been legislated so far: restoration of the Sacred Lands near Blue Lake in New Mexico to the Taos Pueblo Indians. They had used these lands for centuries for religious purposes and regarded them as sacred. But in 1906, President Theodore Roosevelt appropriated these lands for the creation of a national forest, without compensation to the Taos Pueblo Indians. President Nixon

was correct in assessing that this issue is of "unique and critical importance to Indians throughout the country." In fact, the entire message of President Nixon indicated a real understanding of Indian problems; it sounded as if the speech had been written by an Indian elder, which is the greatest compliment I can give. The proposals of President Nixon signal a new national policy towards Indians and, if implemented, will stand as one of the few constructive pieces of legislation for my people since the conquest of Indians.

But one thing is clear: any further assaults on Indian lands and cultures, such as termination, can only produce the kind of despair which leads to violence and revolution. From my experiences with the fishing-rights struggle by Indians in the state of Washington, and with the Alcatraz movement in California, I know that there is a new militant spirit among Indians, particularly young people. The days of passive acceptance of a white-dictated fate are finished. We are determined to control our own destiny and our own future.

Shirley Keith is an anthropologist and member of the Winneajo Tribe which lives at the moment on an Indian reservation in Nebraska. She is now preparing a book as part of a French collection called "La Terre Vivante" (Living Earth), and is to be called JOURNAL OF A NORTHERN AMERICAN INDIAN (to be published by Plon in 1972).

We thank the editors of La Recherche for permission to reproduce this article.

A BLUEPRINT FOR SURVIVAL

Comments

From Sir Eric Ashby, F.R.S.

Sir,

The *Blueprint* contains some statements which are incorrect and some assertions which are not justified by the facts. But to dismiss the message of the *Blueprint* because of these shortcomings (deplorable though they are) would be mere pedantry. If it deserves censure over style and content, it deserves, too, the respect due to sincerity and courage.

The dispute between those who support the *Blueprint for Survival* and those who reject it is a dispute about means, not ends. Everyone who has thought about the future of the environment agrees that exponential growth of population and consumption of non-renewable materials (like fossil fuels and metals) cannot continue indefinitely; it follows that everyone agrees that growth of these two must flatten out.

The dispute is about two issues: (a) How will this flattening out occur? and (b) How can people be made aware that it is going to occur, and adjust their values accordingly?

Those who support the *Blueprint* believe that the phase of flattening out will be accompanied by a collapse of western society unless people deliberately and consciously revise their whole scale of values, abandon urban life, and re-organise themselves into small labour-intensive communities. The technique for achieving this end—according to these supporters is to create a state of anxiety among the public about what will happen if they do not revolutionise their style of life and reduce their consumption of goods and services.

Those who reject the *Blueprint* do not deny that this change of values will occur, but they believe that the transition will be more stable if it is not deliberately engineered (by, for example an authoritarian regime) but is left to the homeostatic mechanisms

which have operated in society for thousands of years. Thus, supplies of fossil fuels will not disappear suddenly any more than supplies of timber did; their increasing scarcity will put up their cost and oblige societies to adapt their style of life to low-energy needs. Populations will not be reduced by decree, but by the increasing difficulties of supporting large families; and so on.

The *Blueprint* calls for an "orchestrated" overall plan to compel people to adapt themselves to live in equilibrium with nature. Opponents of the *Blueprint* do not believe that overall plans of this kind ever have been realistic or feasible even for single nations, let alone the whole world; and they are convinced that attempts to carry out such plans, by propaganda or compulsion, would fail, and leave despair and bitterness in their wake. But these opponents do not deny that change must occur. Their alternative is the prescription of William Blake (one of the pioneers of conservation): to achieve change not through sweeping rhetoric but "in Minute Particulars"; encouraging re-cycling and innovation which conserves resources, diminishing the amount of pollution per unit product, and diverting much greater technological effort from superfluous consumption to minimising the impact of man on his environment. Both parties to the dispute are likely to agree about some of the practical measures which are needed (some device to ration scarce raw materials, for instance). The opponents of the *Blueprint* want to negotiate the transition to a steady-state economy by means of thousands of small adaptations, not necessarily articulated into one grand programme. Those who support the *Blueprint* want a grand programme.

Neither course will be painless. Some tragedy is—in my belief—inevitable. My preference for change through Minute Particulars is simply that this is the way societies have, with great benefit to the common man, adapted themselves for centuries to the consequences of their own impact on the environment. And this adaptation continues. Two centuries of careless exploitation in Britain is now being succeeded by a phase of genuine concern and massive expenditure to make amends for the past. The priorities of society are already changing. I prefer to let this process of adaptation proceed at its natural pace (with all the

risks which this undoubtedly involves), rather than subscribe to a comprehensive *Blueprint* which—unless enforced by autocracy—is unlikely to get further than the drawing board.

Sir Eric Ashby, F.R.S.

Chairman,

Royal Commission on Environmental Pollution.

From The Rt. Reverend Hugh Montefiore

Sir,

You were kind enough to show me a draft of *A Blueprint for Survival* for comment before it reached its final form: some of the comments that follow I made then, and some proceed from further reflection. I said then, and I repeat now, that I warmly welcome the whole enterprise, and I am in general agreement with its practical recommendations. Nothing that follows should overshadow this fundamental accord, both on principles and on measures that need to be taken. Of the points that I want to make, some are comparatively trivial, but others, as I believe, point to fundamental inadequacies both in the analysis and in the remedies proposed. Most of them are to be found in my Rutherford Lecture, *Doom or Deliverance?* (MUP 1972) 48p.

Mineral Resources

On page 7 of the *Blueprint* a diagram is reproduced showing mineral reserves, both static and exponential. On page 41 there is an Appendix on non-renewable resources (which, strangely, excludes the good earth). No evidence is given for the statements about the mineral reserves that remain. Since diminution of resources plays a large part in the main argument of the thesis, it is essential to prove statements about mineral reserves by reference to acknowledged authorities.

Economic dislocation

The process of industrial and commercial "rationalisation" is largely responsible for the increase of unemployment in this country over the 1 million mark. A transfer from flow to stock economies is likely to cause far more dislocation. In paragraph 244 it is stated, in connection with measures proposed, that "naturally the full force of such measures could not be allowed to operate immediately: they would have to be carefully graded so as to be

effective without causing unacceptable degrees of social disturbance". This vague statement needs translating into economic reality. In paragraph 267 the accusation is denied that "we are willing to bring about the collapse of industry, widespread unemployment and the loss of our export market." But I would like to hear an economist asking and answering the question: is it possible to make this transition without great dislocation and huge unemployment? I would like to hear a politician telling us what would be the maximum acceptable degree of social disturbance; and, most important of all, I would like to hear a political philosopher thinking aloud about the ethics involved in deliberately causing present pain and suffering and dislocation in order to promote the future well-being of future citizens.

National Imbalances

In almost all countries of the world, there is a huge imbalance between the standard of material living enjoyed by its richest and poorest citizens. This imbalance is only tolerable to the poorer citizens because of their expectation that their material standard of living will rise, and probably rise proportionately more than that of the richer citizens. If however, the predictions of the *Blueprint* are correct, there will be a ceiling to the nation's material standard of living. The section of the *Blueprint* concerned with "creating a new social system" does not so much as mention the present imbalance, nor does it contemplate any measures to redress it; yet it is likely that this would be as politically necessary as it is morally desirable.

International Imbalance

Here I can best quote from my own Rutherford Lecture: "The finiteness of our global resources and the impossibility of bringing them up to those enjoyed, say, in the Western world, raises in acute form, the question of their equitable distribution. In a situation of perpetual growth this problem is partly obscured by the rising standard of living in poor countries. Where overall growth slows down or ceases, the moral problem of the different living standards in rich and poor countries becomes even more acute. Already the difference between them is enormous, and it is growing . . . If the developing countries thought that one day they could catch up, this

might be just tolerable. But now we know for certain that the world could not sustain that kind of standard of living among all its inhabitants. The case for redressing the balance is overwhelming, especially on a Christian view." (*Doom or Deliverance?* Manchester University Press 1972. p. 15ff.)

This subject surely should be a matter of major concern in *A Blueprint For Survival*: but it is not mentioned.

International Agreement

The *Blueprint* assumes the inevitability of international agreement: a more realistic appraisal would view it rather as an improbability. As these words are being written, it is uncertain whether or not the Eastern bloc may withdraw from the UN Conference on the Human Environment this summer on account of some convention of international politics by which Eastern Germany is not yet a member of the UN, although she will be, all being well, shortly after the conference. National loyalties and rivalries are terribly strong: and yet there must be international agreement to put the *Blueprint* into effect, since ecological problems are world-wide, and if one country reduces its pollution, or produces (e.g.) a car suitable for leadless petrol, it will price itself out of the export market, unless others do the same. We cannot go it alone.

Regionalism

The *Blueprint* rightly stresses the need for regionalism, so that communities may be broken down into smaller more autonomous and more meaningful units. But nowhere is the contrast faced between the desire on the one hand for regionalism and the necessity on the other hand for larger units, or at least larger accord between units, in order to guarantee the right priorities in agriculture, production and pollution.

Ethical Criteria

The *Blueprint* does not raise the real ethical principles underlying the need to change our way of life. What duty do we owe to posterity and why? What right have we to use the resources of the world as we wish and when we wish? What are man's duties, other than self-interest, towards the world of nature, both organic and inorganic, living or sentient? Are its authors working on an unexpressed utilitarian ethic or what?

The Behaviourist Fallacy

The *Blueprint* tells us of many things that man ought to do, but never seems to suggest that there will be much difficulty in persuading men to do them. But man is capable of greed just as much as goodness; and he finds change particularly difficult to absorb. Underlying the *Blueprint* is the suggestion that if only the conditions are right, if we evolve a new social system, man will behave in the kind of way that he should. This is a fallacy. Not even education is sufficient to change long inherited tendencies towards acquisitiveness and greed. What is needed is something akin to religious conversion; an emotional shock affecting the very ground of man's being, in which he finds himself responsible to one whose goodness and grace sustains the cosmos in being; a true perspective in which he sees this world not as an end in itself but in the perspective of eternity; a sense of the holiness of all created things, sustained by the Spirit of God, so that to abuse the created order is to grieve the Holy Spirit of God himself. Man needs a profound inner reorientation if he is to co-operate with his environment in a new and stable kind of ecosystem. He needs to use his God-given dominion over nature is a way consonant with his nature as created in the image of God, that is to say, in a way that is divinely responsive and responsible. Without this change there can be no implementation of the *Blueprint for Survival*. The present signs of coming eco-catastrophe are the outer symptoms of an inner spiritual malaise; and because the *Blueprint* misses this vital truth, it is sadly inadequate. The positive programme that it puts forward is heartening and hopeful; but unless man can find the will to implement it, it will remain a mere aspiration.

The *Blueprint*, in defining the goal, would do well to consider the nature of happiness and the way man can find it. Is it sufficient merely to state the goal of "providing a way of life psychologically, intellectually and aesthetically more satisfying than the present one?" (paragraph 354). Or is happiness better described in the Beatitudes of Jesus?

Yours sincerely,

The Rt. Reverend Hugh Montefiore.
Bishop of Kingston-on-Thames.

From B. Guy

Sir,

Having read your synthesis of the Twentieth Century crisis, entitled *A Blueprint for Survival*, I would like to express my personal admiration and gratitude for the intellectual courage and labour that must have gone into its compilation. I hope, therefore, that you will accept the following criticism of the means you propose in the light of my total acceptance of your ends.

I refer, specifically, to your paragraph 281, sub-sections (b), (e) and (n), and urge you to reconsider the whole concept of using punitive taxation (and its converse, subsidy) as an instrument for changing deeply ingrained human habits.

Experience shows that sumptuary taxes are only marginally effective as a means of altering patterns of consumption. They may persuade people to prefer brand X to brand Y, where there is little real difference between the two, but not to give up practices which you have rightly described as addictions. Successive heavy increases in the duty on alcohol, for example, have not permanently reduced the number of gallons drunk by the children of alcoholics! Moreover, such taxes are socially unjust, in that they bear more heavily on the poor than the rich. Finally, they give the State a vested interest in perpetuating the very things that it is ostensibly trying to eliminate.

If we are to achieve the goal you have postulated, we will have to renounce the hypocrisies as well as the follies of the past, so let us not start by trying to disguise the rationing that may be necessary under the cloak of fiscal measures. To bring book-keeping costs more nearly into line with real costs by compelling manufacturers to pay for the recycling of their waste products, or for rendering them innocuous before discharge into the environment, is a legitimate use of the money mechanism. Arbitrary juggling with prices and costs is not.

In a healthy society such as you propose, individual value judgements (in so far as they are economic) would be expressed through an honest cost/price system, undistorted by governmental manipulation. Where such private judgements have to be overridden in the interest of collective judgements, this should be done openly and impartially by taking the whole

issue out of the cash nexus, thus preventing the private manipulation of grants and subsidies which is such a scandal today.

Yours faithfully,

B. Guy.

St Mary's Airport,
Isles of Scilly.

From I. W. Hill

Sir,

I endorse your *Blueprint for Survival* with enthusiasm, but must point out that it is essential always to get the figures right.

Figure 1. "World Reserve of Crude Petroleum at exponential rate of consumption" is mathematically wrong. I do not know the source of your basic data on oil production per annum, but assuming that it is correctly shown up to the present, and forgetting about estimates of the future, your graph presents an incorrect picture of reality. The faults are as follows:

1. You have drawn a curve of annual oil production. If you care to integrate that curve, an exercise which is easily done with pencil and paper, to obtain the absolute total of oil production year by year since 1900, you will find that world reserves of oil were exhausted in the 1950s.

The reason was that your graph took the original world endowment of oil to be 2,100 billion barrels. Surely Mr W. P. Ryman of Standard Oil estimated that world reserves stood at 2,100 billion barrels at the time he made his statement, which must have been quite recently.

2. Again taking your curve of annual production as true, it showed oil production in 1970 to be 220 billion barrels per annum. Now if production were merely to remain at that level for the next 10 years, then total production for the decade will be 2,200 billion barrels. If Mr Ryman of Standard Oil was right, then production between 1970 and 1980 will exceed the reserves, even at 1970 levels of production.

So the "correct" interpretation of your graph tells us that either we have long since drained the earth of its oil, or that we shall exhaust the reserves before 1980.

Would you please re-examine the facts, recalculate your graph and print a correct picture of our use of oil.

Your arguments will then be all the more credible, and our task all the more urgent.

Yours sincerely,

I. W. Hill.

4 Newby Terrace,
Wigginton Road, York YO3 7HU

From Dr. Michael Altman

Sir,

I am interested in your *Blueprint for Survival*.

I am a vasectomy surgeon on the staff of the Marie Stopes Clinic, as well as being in general practice, and am a member of the Birth Control Campaign.

You stood up very well to the bullying on Wednesday evening's TV programme! I think that the ease with which populations could be brought under control has not been made clear to the public. It is surely only necessary to enable all couples to have only the children they want to have and not the half million a year they do not want! It is these unwanted ones who are causing "population pollution". The ready acceptance of vasectomy by those who really know what it is, and that it is not the same as castration, makes its potential easy availability a matter of great moment. The administrative obstruction at present preventing the provision of vasectomy by trained general practitioners is ludicrous but very effective and could be easily swept aside at no financial cost if the public could be made aware of the absurdity still held on to by those in power.

Among these absurdities I list the fact that (1) general practitioners are denied facilities to operate in hospitals in England whilst they are allowed to in Scotland and Wales and (2) GPs are allowed to charge NHS patients for prescribing the pill or fitting a coil but if the patient wants a vasectomy he must first resign from the doctor's NHS list, become a private patient and rejoin the list later—a complete waste of time, energy and expense!

I would be very interested to attend your future meetings and to be associated with your Campaign for Survival.

Yours faithfully,

Dr Michael Altman, M.R.C.S.,
L.R.C.P., M.R.C.G.P.
1012 High Road, London N.20.

Reports

Concorde and ozone belt

A simple-minded person might be excused from thinking that the cost and the problem of sonic boom would have been sufficient reasons in themselves for keeping Concorde well and truly grounded. But it's obvious one needs a rather more devious mind to follow the vagaries of the French and British governments, who are intent it seems on pursuing a project which goes so counter to their interest.

Well, if money and the complaints of a few nerve-shattered farmers are not enough to deter the French and British from building more Concorde they may find themselves stopped simply because the rest of the world decrees that not only are such aircraft unnecessary, but they may also be dangerous.

As always the environmental issues are fogged with uncertainty, but the fear, now being expressed by several scientists, is that a fleet of supersonic aircraft might irreversibly alter the radiation balance of the earth by

destroying a significant part of the "ozone shield". This shield is vitally important because it absorbs ultra-violet radiation in the higher frequencies, i.e. below 2400 Ångströms. If such radiation were able to penetrate the atmosphere down to the earth's surface the consequences could be disastrous; for few would deny that such radiation could make animals go blind, could give rise to a high incidence of skin cancer, and could cause the death of a large number of plants. Life on earth would indeed be threatened.

But it's one thing to list the horrible consequences should high frequency ultra-violet radiation penetrate the atmosphere and another to suggest that supersonic aircraft might cause such a phenomenon. How then do some scientists have the temerity to come up with such gloomy prognoses?

The first cries of alarm were heard in the summer of 1970 when the Massachusetts Institute of Technology sponsored its *Study of Critical Environmental Problems* (SCEP). The nasty word then was water vapour and H. Harrison estimated that by releasing this seemingly innocuous substance a fleet of SSTs (500 aircraft cruising in the

atmosphere an average of seven hours per day) could cause the ozone shield to be reduced by as much as 3.8 per cent. Other scientists consequently did their sums, and they all agreed that water vapour would have a smaller effect than that calculated by Harrison.

At that time everyone was concentrating their attention on water vapour which of all the exhaust gases released by SSTs was considered to be the most significant in decomposing ozone. And since the effect of water vapour was no longer seen to be as great as was once feared, the SCEP scientists concluded that a fleet of SSTs would pose no serious threat to stratospheric ozone. The SST pundits were vindicated.

But practically everyone had overlooked the nitrogen oxides—present in minute quantities in the stratosphere and considered to play a negligible part in the important chemical reaction governing the size of the ozone shield. Instead, claims Professor Harold Johnston of the University of California, the catalytic destruction of ozone by nitrogen oxides is "the most important natural process in the balancing of ozone". Dr Paul Crutzen, of Oxford University, approaching the



Hamish Hamilton

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by Stanley Johnson

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Reports

problem from a different angle, comes to just the same conclusion.

Both scientists see the ozone shield in equilibrium against a build-up of ozone on the one side, and a breakdown on the other. Harsh, short-wave ultra-violet radiation splits oxygen into its atoms and triggers the formation of ozone. The nitrogen oxides, acting as catalysts, then complete the cycle by splitting the ozone back into oxygen. "And," says Professor Johnston, "if it weren't for this loss mechanism all the oxygen in the atmosphere would long ago have been converted into ozone."

But if man is lucky that there is enough nitrogen oxides present in the stratosphere to keep him and his fellow creatures and plants supplied with oxygen, he is also lucky, according to Professor Johnston, that the ozone shield is as thick as it is, to keep out those life-destroying short-wave ultra-violet radiations. So it becomes very important to know just what effect would a full fleet of SSTs have on the levels of nitrogen oxides. Of course no one knows, but since Professor Johnston and Dr Crutzen are some of the only people to consider such a problem, one has to take their conclusions seriously.

Almost a year ago (March 1971) a scientific panel for the US Department of Commerce told Professor Johnston that the background levels of nitrogen oxides in the stratosphere were three parts per billion (10^9) and that the levels could reach steady-state level of 70 parts per billion through supersonic transport. This statement horrified Professor Johnston, as he quickly realised that at such levels the world would be pushed towards major disaster.

Since that meeting the figures have been revised downwards. Scientists are now claiming that they do not know the exact levels of nitrogen oxides in the stratosphere, but that they lie between one and 10 parts per billion, and that the exhaust would not be as contaminated with these substances as was originally stated. Full scale operation of the SST including Concorde is now estimated to increase the nitrogen oxide content of the stratosphere by one-tenth as much as was originally estimated.

"With about a ten-fold uncertainty in the nitrogen oxide background and

about a 10-fold uncertainty as to the maximum to be expected from SST exhaust, there is a hundred-fold uncertainty into the actual effect of full scale SST operation," says the Berkeley professor. "If one gives all benefit of doubt to the SST, then the increase in stratospheric nitrogen oxide is a matter of 10 per cent. If one places all benefit of doubt in the opposite direction, then SST will increase the stratospheric nitrogen oxide by a factor of 10."

All sorts of unknowns confuse the picture. There is considerable ignorance about the mixing of gases in the stratosphere. Do they diffuse upwards as readily as they diffuse downwards? What about the rates of the reactions and does nitric acid act as a catalyst in the breakdown of ozone or is it inert? If it is inert any extra water vapour will tend to slow down the decomposition of ozone by stimulating the formation of nitric acid from the nitrogen oxides. And what about the problem of seasonal variations? Dr Crutzen points out that the most dangerous time may be during the summer when the flights are at a maximum, the wind systems are weak and the ozone is at minimum.

Government complacency

Flying in the Concorde is enough, it seems, to give one an insight into environmental problems that other less fortunate mortals can never hope to possess. Lord Rothschild, of the Government's "Think Tank", is one of the latest VIPs to take to the air in Concorde and his verdict on landing as reported in the *Daily Express* (January 15, 1972) was that Concorde was "an absolutely superb plane and an incredible buy for any country".

"Scare stories about pollution are bunkum," he went on. "There is no interference with the ozone layer of the atmosphere and no ill-effect at all on the stratosphere."

Naturally members of the *Anti-Concorde Project* were a little perturbed that Lord Rothschild should be party to information that they knew nothing about. So, the Project organiser, Richard Wiggs, wrote to the eminent peer for his source of information. Lord Rothschild's reply was most helpful.

"I can assure you," he stated, "that the Government has made a very careful study of Concorde's likely effect on the upper atmosphere, including Dr Johnston's theoretical work on ozone concentrations. A number of Dr Johnston's

assumptions were inapplicable to Concorde, and the study ignored certain meteorological considerations.

"When account is taken of these factors, all present evidence confirms the view that the effect on the ozone layer of even a large number of Concorde would be well within the normal range of natural fluctuations, and that any effects on global temperature or climate would be insignificant."

It's interesting to compare the reaction of the United States National Academy of Sciences to Professor Johnston's work. In July the Academy formed an *ad hoc* review panel, and six months later the panel reported:

"... there appears to be general agreement that Harold Johnston's conclusion as reported in his paper, *Reduction of Stratospheric Ozone by Nitrogen Oxide Catalysts from SST Exhaust*, are credible... and that the possibility of serious effects on the normal ozone content cannot be dismissed. To the extent that existing information permits, Johnston has done a very careful and detailed analysis. He has done a service in bringing this problem into full view and stirring the needed debate within the scientific community..."

Lord Rothschild based his dismissal of Johnston's work partly on the fact that Johnston had not considered meteorological factors. It seems he has overlooked Paul Crutzen's work. Dr Crutzen who has now left Oxford for the Institute of Meteorology, the University of Stockholm, has made models to take account of air mixing in the stratosphere and of chemical reactions brought about by the influx of light. Using dynamic models, rather than the static models of Johnston, he finds that nitrogen oxides emitted from SST planes will have a much greater effect on ozone than is predicted by Johnston. He concludes in a paper soon to be published:

"With our present knowledge it is not possible to make reliable predictions of changes in the atmosphere ozone amount due to nitrogen oxide emissions from future supersonic air traffic in the stratosphere... It cannot be excluded that the atmosphere ozone content, at least locally, can be reduced to dangerously low levels..."

Licence to go ahead Lord Rothschild?

Peter Bunyard

Reports

The Conservation Society

On the 12th February, 1972, the Council of the Conservation Society voted by a large majority that the Society should join the *Movement for Survival* (*Ecologist*, January, 1972) the first society to do so. This means that the Conservation Society will be one of the bodies that anyone who wishes to support the Movement can join, and this article explains briefly the aims and origin of the Society for those readers of *The Ecologist* not already familiar with them.

The Society was founded in 1966 by Dr D. M. C. MacEwan, and differed from existing societies concerned with conservation in emphasising the need to treat the common causes of environmental problems and not merely their symptoms. Although these causes—the population explosion and uncontrolled technological expansion—are now widely recognised, this was not the case six years ago, and the growth of the Society has paralleled this growing

recognition, to which we hope we have made a significant contribution. Thus our numbers had only reached 1150 after three years, but more than doubled (to 2,800) in the fourth year, and repeated this performance (to over 6,000) in the fifth.

The annual subscriptions of our members (the standard rate is £2) provide our only source of income, and we do not enjoy the benefits that would go with charity status, since it was recognised from the start that we should need to campaign for changes in the law. We are able to operate, therefore, without constantly looking over our shoulders at the Charity Commissioners.

Members of the Society are automatically members of any local branch they wish to join, and with 40 of these now in existence it is increasingly possible to provide members with a branch or local group within reach of their homes. A Newsletter is sent to all members every two months to help to keep them in touch with the Society's progress.

Until early in 1971 the Society was operated entirely by voluntary work, but increasing size then made paid staff

and a permanent office essential, and this was established in 1971 with a full-time Director and office staff of two in Walton-on-Thames, Surrey.

What does the Society do? It has been our central belief that unless the causes of the environmental crisis are understood it will be impossible to mobilise the massive effort needed to deal with them. Consequently, we have seen our task as primarily one of education and political pressure, acting on both public opinion and government. For example, one of our first concerns was the effect of population growth in this country, which we analysed in detail, with proposed remedies, in "Why Britain Needs a Population Policy", thousands of copies of which have been circulated to MPs, government departments, and the general public. A recent poll of public opinion showed that up to 65% of people now had views on population agreeing with our main conclusions, and the report on population from the Select Committee on Science and Technology (May 1971) had clearly been influenced by them.

A further publication, "Why Britain Needs a Conservation Policy for the

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Environment" followed and as the wider implications of the environmental crisis have become clearer, we have defined our international policies on population growth and technological expansion in a widely-circulated memorandum on the 1972 UN Conference on the Human Environment, submitted to the Secretary of State for the Environment. Supplementary memoranda on pollution and resources analyse the problems in detail, and reach conclusions and recommendations for action very similar to those in *A Blueprint for Survival*.

We consider educational work to be of great importance, and a number of papers and guides for teachers on environmental education have been prepared. This side of our work is handled by the Conservation Trust, which has charity status.

Although, as stated above, our aim is to change the way environmental problems are perceived, whenever possible our members initiate or co-operate in practical activities. In this, as in much else, the energy and enthusiasm of our branches has been all-important. We have worked to obtain better family planning services from local authorities, and have co-operated with the Birth Control Campaign in this since its formation in April 1971. Members of our Warwickshire Branch started the investigation into the dumping of toxic industrial wastes in the Midlands, the repercussions of which still continue. We always try to relate local problems to broader issues of policy; for example, difficulties arising from new road developments provide an opportunity to question the increasing domination of our lives by the car.

Officers of the Conservation Society have maintained close and cordial contacts with the staff of *The Ecologist* since it began. The Deputy Editor of *The Ecologist*, Robert Allen, is a member of the Council of the Society, and the Director and the Secretary of the Society (who are Associate Editors of *The Ecologist*) took part in the discussions leading up to the production of *A Blueprint for Survival*. These two—John Davoll and Sam Lawrence—have been chosen by the Society as its represen-

tatives on the Action committee of the *Movement for Survival*, and this will ensure close co-operation as it develops.

More information on the Conservation Society, and forms of application for membership, can be obtained by writing to:

The Director,
The Conservation Society,
34 Bridge Street,
Walton-on-Thames, Surrey.

Dr John Davoll

Alternatives to Laboratory Animals

The quality of life in an advanced society depends on a number of physical and metaphysical characters. Health is amongst the former and our attitude towards animals amongst the latter, and the two are linked directly in the use of laboratory animals for the study of health and disease. No matter what stand one may take when considering the extent to which the human species should benefit at the expense of other animals, most people would agree that it is preferable not to exploit animal life if it is not absolutely necessary to do so. This is the attitude taken by FRAME (Fund for the Replacement of Animals in Medical Experiments) in relation to laboratory animals, and its policy is to publicise and promote methods of experimentation that reduce or eliminate the need for animals in biological research and teaching.

Amongst the range of uses of laboratory animals, many are used as models for the human being in investigations of physiology, disease, toxicology, etc., and are often unsatisfactory for the very reason that they are not the same as the human. In order to obtain species more closely resembling man than the long-used rabbit, rat or guinea pig, primates are increasingly being sought for laboratory use, and because of the considerable difficulties associated with breeding these in captivity there is inevitably a rise in the demand for animals caught in the wild. This is regrettable not only because the populations of some primate species will be drastically reduced (the existence of some monkey species is already threatened) and because trapping in the wild is associated with considerable wastage and cruelty before the animals reach the laboratory, but also because laboratory experiments benefit greatly from uniformity and standardisation of

their experimental material, yet animals caught in the wild are neither uniform nor standardised.

There is, therefore, a real need to find replacements for animals in research, and a number of potential replacements are already available which deserve attention. The field of toxicology may be taken as an example. Hundreds of chemicals have been introduced to our every-day environment and our knowledge of their safety is based on a series of tests in a limited number of animal species. There are virtually no data on how possible inter-actions of these chemicals will affect experimental animals, let alone man. Yet in recent years there has been a considerable increase in the availability of animal, and in particular human tissue cultures which could be used in these studies. By using human tissue cultures the problem of species difference would be overcome and, by using cell strains of various kinds (cell populations that remain normal and unaltered during growth over many generations) vast amounts of standardised tissue could be produced. In the past there have been claims that some tissue culture results agree well with animal or human studies, whereas at other times the results do not agree. It would be useful, therefore, if a thorough investigation could be carried out of the potential value of tissue cultures in toxicology. A range of sensibly chosen tissue culture systems could be tested in conjunction with the animals used at present and a pattern of agreement and disagreement between the results could be built up. When particular tissue tests worked well for particular classes of chemicals, animal studies could possibly be eliminated altogether, and in other cases a system of screening out harmful substances before animal tests were begun could be established. Where results did not agree an investigation for the causes of this could lead to a greater understanding of the potential uses of tissue culture systems and, possibly, through appropriate modifications, could lead to their greater exploitation.

Tissue culture is just one possible alternative, for once a potentially safe chemical, a drug for instance, has been found, it can be given to man in minute quantities, far lower than an "active" dose, and the metabolism in the whole body detected by refined analytical techniques such as gas chromatography and mass spectrometry. One argument

Reports

raised against the use of tissue culture systems is that the small part of the whole organism being investigated, the tissue culture, may not react as the whole animal will because it fails to simulate the inter-action between different tissues and organs in the body. The use of analytical techniques such as these means that the whole-body reaction can be determined in man before a therapeutic dose is given and this is surely preferable to the present system in which the administration of a new drug is little more than an extension of the experiments on animals in which its safety was assessed.

In addition, with the increasing size of computers and with increasing knowledge of programming, it is now possible to use computers to simulate biological processes, that is to use mathematical rather than biological models for solving research problems. This is a use for the computer beyond that of data processing and it demands a knowledge across scientific disciplines that is at present all too rare. Yet computer simulation is applicable to a surprisingly wide range of biological studies and papers have been written on its use in a wide variety of subjects.

There are other alternatives already of potential available, but the essential feature of those described above is that data for humans is derived from humans or from human tissues. Perhaps the greatest developments, however, will come from the application of a combination of methods—for instance a drug screened on human tissue cell cultures, cell changes monitored by electron microscopy, whole-body metabolism studied by sensitive chemical analyses and all the data used in a computer simulation programme to predict other properties and effects of the drug. This cannot happen today because the methods are not yet fully developed, but there is no real reason to doubt that it will come, and the more work that is put into developing the existing techniques and finding new techniques, the sooner man will live in a safer environment.

In an attempt to further methods of research such as those described above, FRAME has produced a technical leaflet *Alternatives to Laboratory*

Animals describing briefly the range of studies in which replacements might be developed. This leaflet has been distributed widely to scientists and others both in Britain and abroad. In addition a bibliography of papers relating to these techniques has been prepared and FRAME's Bibliography Centre was opened recently in London to house the many papers listed in this publication and to act as a general information centre on replacements. The unique bank of information which is being accumulated is already proving of value to research workers. It is FRAME's aim to see this Centre become a world source of information on more humane and exact methods of research. By focusing attention on these developments FRAME hopes to present a practical solution to the problem of experimentation on animals, from which all should benefit.

Dr T. W. Hegarty

Classified Adverts

PH.D. CHEMIST/MICROBIOLOGIST seeks research into returning fertiliser/pesticide based agriculture to bio-stable footing. Please contact Dr S. A. Quarrie, Dept. of Chemistry, The University, Manchester M13 9PL.

HONOURS GRADUATE of Psychology with engineering, handskills and horticultural experience seeks environmental/pollution job. Box E151, *The Ecologist*.

ECO-IDEAS: Required information and ideas for Ecological projects in schools, for feedback in mail newsletter form. Please send to Eco-Ideas, c/o Anthony Lovell, Complementary Studies, Winchester School of Art, Park Avenue, Winchester, Hants.

BLUEPRINT FOR CONVERTING. ... unemployment into leisure, could facilitate cutting morbid G.N.P. growth, progress to ecological equilibrium, and real option of survival. Read "Automated Incomes" Booklet by Gilbert Rae. 23p post-free from Harold Trill Ltd. (10E), 78 Camden High St., London, N.W.1.

ECOLOGICALLY - BASED LOW - IMPACT TECHNOLOGIES. A study group set up to examine such systems for the support of smaller scale decentralised communities, requires information on: Wind, water, solar and other renewable energy use; housing construction and servicing; waste recycling; transport; tools; medicine; workshop technology. Please contact A. MacKillop, School of Environmental Studies, University College, Gower Street, London W.C.1. 387 7050 ext. 650.

NATURE IN YOUR TOWN. Most children grow up in towns. This school project stimulates responsible interest in Nature among town children. Adaptable to country areas. *New Schoolmaster*: "veritable treasure house of things to do—a practical book—remarkably inexpensive." Complete pack: Wallchart,

Teacher's and Pupil's books £1 inc. p & p or send 23p for descriptive leaflet. Humane Education Centre, Avenue Lodge, Bounds Green Road, London, N22.

SECRETARY REQUIRED for Chirnside Countryhouse Hotel, Berwickshire. Tel: Chirnside 219.

LARGE FURNISHED ROOM, overlooking beautifully kept gardens by River Thames, with meals and services. Would be ideal for a conservationist minded person. (Could also be used for light office work.) Mrs Rollins, Flat 2, River House, off Manor Road, Walton.

CHALET, in secluded Hertfordshire naturist camp with swimming pool for sale. Suitable couple or small family. Electricity, built-in fittings, sink unit, partly furnished. Quick access North London road or rail. Worth £400. Now (off season) available for £325. Apply Box E150, *The Ecologist*.

The Night Assemblies Bill notwithstanding, Friends of the Earth Merseyside are going to the Bickershaw Festival on May 5th, 6th and 7th. They want to take an inflatable Dome, a travelling exhibition to preach to 200,000 decaying cities. Donations would be appreciated to The Dome Fund, c/o Frank Newton-Adair, 29 Ashburton Avenue, Wallasey, Cheshire. If you have any material for the dome show, please send details.

LOOKING FOR RIGHT PERSON with principles as well as money to buy swinging successful restaurant dedicated to health foods and vegetarianism. Turnover £400 plus per week. Private reasons only make sale necessary. Growing prospects. Accommodation available. A genuine and unique chance. No speculators please. Box E149, *The Ecologist*.

THE COMMONWEALTH COLLECTION is a radical peace library and free postal-loan service, from which one may borrow, for up to two months, books or periodicals dealing with many aspects of the planetary mess man has created and with the many gropings towards a society that is in harmony with nature. It includes a large section on the ecological crisis in particular, but also makes available works concerned with a non-violent approach to man's predicament in general, in such fields as religion and the spiritual life, education and economics, pacifism and decentralism ... The library has just published another edition of its catalogue (with details on borrowing) incorporating a January supplement of nearly 200 recent additions. 12p will cover the duplicating and postage cost of the complete catalogue, and 4p the supplement only, preferably in stamps, though anything extra will help a worthwhile service to survive. Address: 112 Winchcombe Street, Cheltenham, Glos., GL52 2NW.

A NEED FOR FORMATION of groups or communities showing how man can live a satisfying life with the minimum pollution of environment and expenditure of limited world resources. Writer wishes to contact others with same opinion. Box E148, *The Ecologist*.

INFORMATION FOR SURVIVAL. Possibly, Students or staff at the Universities of East Anglia, Cambridge or Essex. *The Ecologist* proposes to produce digest of relevant information from a series of journals. Agents required for abstracting. Those interested should write to Dr K. E. Barlow, The Old Forge, Great Finborough, Stowmarket.



Gulliver in Automobilia

The Author Altereth his Opinion of the Medical Art

Those Readers who perused the Account of my earlier Voyages will perhaps recall that I am by Trade a Surgeon: it was therefore with peculiar Interest that I took upon me the Task of investigating the healing Arts of the Automobilians. Surely here at least, I reasoned inwardly, shall I find that Encrease of Knowledge hath not diminished Happiness; in the Cure of the Sick, the Alleviation of bodily Pains, and the Postponement of untimely Decease, the Ingenuity of Man finds its best and only harmless Exercise. Alas, my Hopes proved over-sanguine: here too I discovered that those who seek to set at nought Nature's Laws mar more than they amend; and the Automobilians appeared to me like Men lost in a great Wood, who wander into ever worse Divagations, because they are too proud and headstrong to retrace their Steps to the Place where first they went astray.

Many Diseases, they assert, are caused by Creatures invisible which they name Germs; and with Pills and Potions and ritual Cleansings they drive these malignant Beings away. But it is observed that these Expulsions are of ever shorter Duration: the weaker Pests are destroyed, the stronger survive and return with their Progeny. I was reminded of that Man of whom Scripture telleth who, being cured of an evil Spirit, was presently afflicted with seven others more wicked, so that his last State was worse than his first. Many, too, are but saved from the Vanguard of the Host of Diseases, to fall Victim after a short Delay to Foes more terrible and resolute. For it is certain the World is a Fray from which no Man escapes with his Life: and I am doubtful of the Advantage of being cured of an Ague or Consumption, to waste away at last with a Cancer or linger for Years helpless of a Stroke.

No such Doubt, however, assails the Minds of the Automobilians: who universally regard Death with so great Fear and Superstition, that they suffer not those that are mortal sick to lie abed in their own Homes, but must needs bear them away to common Hospitals to die, like aged Paupers in a Workhouse. Hence many come to Manhood knowing Death only by Repute, and never by personal Observation; and it is small Wonder if Men so schooled seek to avoid what they fear, as the Ostrich doth, by refusing to regard it straight. The Physicians, therefore, with greater Skill than Compassion, assiduously fan the dying Flame of Life, and deny the suffering Soul the Release a kindly Nature has ordained: like gimcrack Builders who patch and shore a House they can never make good. Among us, if a Man be sick or suffer Hurt, the Doctors can but speed his Recovery or ease his Departure: and in a little While he will be either well or dead. But in Automobilia Thousands are yearly saved from Death, whom no human Power can restore to Health: they linger on the Threshold betwixt two worlds, like that unhappy Sciron that Theseus flung from a Cliff, whom neither the Sea nor the Land would receive. The Oath of Hippocrates forbids the Giving of any deadly Drug: but doth not (by my Reading of it) compel the Physician to prolong his patients' Lives beyond what is to their Benefit. No Person should suffer the Fate of the Sybil in Petronius' Tale, that was so wasted and shrunk with Age as to be confined in a Jar, and gave no Answer to any that spoke with her, save only "I want to die".

It is agreed among them all, that a Life of Indolence doth imperil the Heart, and that the Smoak of Tobacco putrefieth the Lungs: but most of them choose rather to risk these Infirmities than to forgo the Pleasures that cause

them, like Gallants that love their Whores more than they fear the Pox. They have, besides, so great Trust in their Physicians, that they suppose no Sickness incurable until Experience proves them wrong: and neglect their Bodies, as careless Children do their Cloaths, in the Belief that some one else will always mend them. The Surgeons are indeed marvellously cunning in the Devices they employ to replace faulty Limbs or Organs: but their Enthusiasm in their own Ingenuity oft outruns their Sense, and their Desire for the Plaudits of the Vulgar overrides their Compassion. They will spend more in vainly grafting a dead Heart into a living Body, or contriving a Machine to fulfil the Office of a distemper'd Kidney, than would suffice to abolish a hundred troublesome but curable Incapacities.

They employ Drugs innumerable to suppress the Symptoms of Diseases they cannot or will not cure: I was told that many take a Pill to make them sleep, and another when they rise to make them wakeful, and a third to cure the Headache the first two have induced. Small Wonder if they are at length as much enslaved to their Pills as a Drunkard to his Liquor. And as the Individual is weakened by this Regimen, so is the whole Race enfeebled by another Cause. Every Shepherd knows that by preserving the best Lambs for breeding he will improve his Flock: and the same is doubtless true of Men. But the Automobilians, when they can, save alive such infants as are sickly and deformed, and raise them up diligently to lead Lives of Misery, and perhaps to bequeath their Defects to Posterity. The Precepts of Hippocrates are, I fear, of but little Service in such Dilemmas as these: and the Physicians who abide by them are like Mariners who must sail among Rocks and Shoals guided by a Chart which, though they know it not, is of quite another Coast.

Nicholas Gould

Ecotechnics

by Arthur J. Puffett

Plastics Recycling Becomes a Reality

A solution to a serious environmental problem has been found, surprisingly, by a member of that oft-maligned industry—packaging.

A machine which turns waste plastic into a new raw material has been developed by Regal Packaging Ltd. of Kentford, near Newmarket.

A wide variety of throw-away plastics can be shredded and fed into the machine, coming out at the other end as plastic sheet which can be heat-formed into a variety of shapes.

Depending upon the characteristics of the original material, new board can be produced as strong as steel or as pliable as leather. And because it is made from waste material it is cheaper than almost anything else.

The biggest virtue of the new process is that it can recycle virtually all types of plastic scrap without sorting. Squeazy bottles, faded plastic gnomes, even biscuit packaging and vinyl-coated wallpapers can all go into the mix together.

The first of a generation of "plastic-eating" machines now in production at Regal's factory is producing plastic pallets used in the handling of goods by fork-lift trucks. Regal can turn out pallets for £1 as against £8 by the more usual injection moulding process. Should any pallets be damaged in normal use they are not written off—instead they simply go back into the machine to be re-formed.

The pallet market in the UK alone is worth £26,000,000 but the machine has much wider applications.

It can produce a plastic substitute for chipboard which is stronger than the original, longer-lasting, and less than half the price.

Mr Roy Paske, chairman of Regal Packaging, compares the new raw material to ready-sawn timber and says "It can be worked with conventional tools just as you would timber".

He sees a tremendous range of applications for the new material in the

building industry, caravans, ships, cars and the packaging trade and—as a sideline—the creation of a new generation of Steptoes, "totting" for waste plastic instead of brass bedsteads. Environmental agencies such as Friends of the Earth should find this idea a winner.

Widespread use of the machine will save a great deal of money by cutting the import of raw materials and providing a ready market both for manufacturer's scrap and for the "disposables" which litter the countryside.

"This is a much better solution to the problem of pollution than the drive for biodegradable plastics which decay on exposure to the elements", declares Roy Paske. "Why waste a valuable raw material when it can be put to good use?"

Regal Plastics is well known in the corrugated board and case trade and it was their development of a waterproof cardboard which led to the discovery of the "plastic-eater". Waterproofing came from a plastic liner built into the cardboard but the board mills could not take the firm's waste because they had no way of dealing with the plastic content.

Using standard heating and pressing machinery, Roy Paske and his 24 year old son Michael, who is the firm's managing director, set about experimenting. Their first success came in the kitchen, when they succeeded in heat-forming scrap plastic in a casserole in the oven.

Six years of development have now produced a machine to do the job, available at a cost of £25,000.

"Regal will use some of these machines" said Roy Paske "but our aim is to supply them to other users, with an agreed royalty on production. The machine will clearly appeal to the people who produce plastic products and are looking for a way to use manufacturing scrap. It is also important to chain stores which have a great deal of plastic waste material which could be used—and of course the local authorities collect a great deal of plastic waste".

The National Research Development Council has backed the research work into this project.

Mr Michael Paske said that it was the variety of the materials which could be used which made the machine unique. "With vinyl wallpaper in the mix we can produce boards with a random decorative finish already sealed in.

Plastic board can be made which is as strong as steel or as pliable as leather—and at various strengths in between."

It is extremely encouraging to find a company, which apart from making money has found the time to evolve a basic recycling process without having to resort to high technology substitutes. Congratulations Roy Paske and Regal, and to the NRDC for its foresight.

Coming events

23 April—Great Wildlife Rally at the Royal Albert Hall. Speakers: John Aspinall, Edward Goldsmith, Nigel Sitwell. Tickets 50p and 25p. See advertisement on page 7.

6 May—Lead Pollution and Public Health Professor Derek Bryce-Smith will be speaking on these subjects at a meeting at Brighton Technical College, at 7.30 p.m. The meeting is being organised by the local groups of the Soil Association and the Conservation Society.

8 May—The Movement for Survival, Queen Elizabeth College, University of London, presents "A Blueprint for Survival", a one-day seminar beginning 9am. Chairman John Yudkin, Professor of Nutrition, Queen Elizabeth College; speakers include Michael Allaby, Soil Association and managing editor of *The Ecologist*, Dr. John Davoll, Director of The Conservation Society, Robert Edwards MP, Transport & General Workers' Union, Edward Goldsmith, editor of *The Ecologist*, Dr. Kenneth Mellanby, Director, Monks Wood Experimental Station of The Nature Conservancy, Jimoh Omo-Fadakah, development economist, Dr. Brian Johnson, Institute for Development Studies and associate editor of *The Ecologist*, Sir Geoffrey Vickers, ex-member of the National Coal Board and Medical Research Council. Representatives of industrial management and the Government have been invited. Further information from Michael Schwab, Queen Elizabeth College, London W8.

10-17 May—Chirnside Soil Association Week at Chirnside Countryhouse Hotel, Berwickshire. Details from Commander R. L. Stuart. Tel: Chirnside 219.

16-25 July—1972 Landscape Planning Symposium on: "Changing Structures in the Agriculture of Europe", with special reference to conservation and to the ecological and visual impact on the European landscape. The Netherlands. Further details from Xavier Monbailliu, 24a Chalcot Crescent, London NW1 8YD.

3-5 September—ENERGY AND HUMANITY—Conference. International Society for Social Responsibility in Science. To be held at Queen Mary College, Mile End Road, London E.1. Sessions: 10.00-13.00 and 14.00-17.00 hrs.

1-3 May—Conference on breeding of endangered species, to be held by Fauna Preservation Society, and Jersey Wildlife Preservation Trust at Conference Room, Hotel de France, St. Helier, Jersey, Channel Island.

Movement for Survival (M.S.)

The response to the announcement for the formation of a Movement for Survival has been very encouraging, further details of the Movement will be announced in our May issue.

Down to Earth



by Lawrence D. Hills

It pays to advertise

British expenditure on advertising in 1970 was £529 million or 1.2 per cent of the gross national product, 1.7 per cent of the total spent by all consumers and roughly £9 for every man, woman and child in the country. So the average two child family pays £36 a year for everything from T.V. commercials to mature Jewish ladies wishing to marry readers of the *New Statesman*.

Unless she starts her own matrimonial agency and gives herself first choice of the clients, when her advertising will be a trade expense deductible from taxation, she will pay for it herself. Like the ex-public schoolboy aged 34 who is still willing to go anywhere and do anything, and the losers of white kittens with three black paws who are responsible for perhaps £29 million out of £106 million spent on classified advertisements.

Just as we subsidise owner-occupiers by making building society interest tax deductible, the tax paying public subsidises commercial advertising, because we would pay that much less tax if the £500 million left after deducting the "private sector" were collected by the Inland Revenue. Prestige advertising by mighty firms gains them some value, but handing the money over in company taxation gains nothing. We pay directly in the price of our stamps for the G.P.O. advertising that tries to make us like what they have decided to make us take.

As the 292 Advertising Agencies who design most advertisements for a discount on their cost (which was £207 million for display advertising in the press, £125 million for T.V. and £29 million for posters, cinema, radio and transport including invitations to typists to send a happy day changing jobs), will explain, this is only in theory. Without commercial advertising there would be no profits to tax, for it is this, rather than love, that makes the modern world go round.

Apart from the widest choice of goods and services in history, our

babies, our old age pensioners and everyone in between, gain several advantages from the money they spend on advertising. The £226 million that went to national and regional newspapers bought us the freedom of the Press, for whenever we pay 3p for the *Daily Mirror* or 8p for the *Sunday Times* we are handing in invisible "packet tops" from advertising, instead of paying 6p or 16p full price.

When we read features designed to make us take more expensive holidays between holiday advertising, pull-out supplements on new cars full of well illustrated advertisements, and slim and scornful ladies in new dresses colour photographed in Amazon jungles with public relations handouts about them, we are being sold a "Giant Family Size" pack with only three handfuls of real newspaper in the bottom. Neither newspaper proprietors nor advertisers can be blamed for the decision of our politicians to replace the principle of obeying a mandate from the voters, with unimpeded progress towards 1984. Our Free Press is dying today from the loss of the Democracy that was its lifeblood.

The major value of advertising, we are told by the advertising industry, is that it cheapens everything we buy, for it increases sales until the successful advertiser can instal more efficient machinery and reduce costs by mass production. In 1952, however, we spent only £119 million on advertising, just over £2.33 each, which was 1.1 per cent of our smaller consumer expenditure, so even allowing for inflation, it seems that spending 50 per cent more in proportion has not brought prices down much after 20 years of ever-increasing advertising.

During that twenty years we have been told repeatedly that inflation is caused by too much money chasing too few goods, but some of it could have been from too much advertising chasing our demands higher than our wages and salaries. Our advertising agents are highly skilled demand

makers, and the present inflation race began with commercial T.V. It may well gain a second wind with a Second Channel.

It is the advertisers job to persuade us that we are on the poverty line without a colour T.V., a holiday in the Seychelles, and a new car every other year. We double our consumption of irreplaceable fossil fuels every 10 years, and it is the advertising industry that has put a tiger in our tanks to devour the World's resources.

The advertising industry itself is highly conscious of this problem and, as Mr Michael Davie said at the Advertising Association's Brighton Conference in 1971, "It is imaginable that the advertising profession will before long have to turn its attention to persuading people to moderate, not to increase their demands on the finite earth."

The question is just *how* this can be done, for no advertiser will continue paying agency commission for advertisements written to produce falling sales. It is possible that selective bans on advertising by resource greedy industries, with tax rebates of perhaps half the previous year's expenditure would be far more effective than tinkering with the Bank Rate, "touches on the tiller" or freezing and thawing.

Perhaps the first experiment could be a complete ban on tobacco advertising (not merely on T.V.) which would at first mean no new brands, a slow fall in consumption, and ample funds for diversification from saved expenditure. The saving in resources from fire engines to hospital beds would be a long term bonus. Next on the list could be petrol companies, with advertising allowed only for new developments such as methane and alcohols that saved fossil fuels, with improvements in the technique of restriction as we learnt how to control the advertising that is the mighty and until now uncontrollable force that rules our lives. No "stable state", no planning for the future, is possible until we can stop progress—from a greedy world to an exhausted and polluted one.

The advertising that will remain will be for music, the arts in general and fields where non-exhaustible products or services are involved. Like the matrimonial agency run by the mature Jewish lady who married the ex-public schoolboy of 34, and finds it pays to advertise.



Friends of the Earth Newsletter

One of the problems presented to any author of the FOE monthly newsletter is topicality—or rather the lack of it. There is such a time gap between the words leaving the pen and appearing in print that the humble scribbler simply has to attempt to gauge what news will retain sufficient interest-value to be worth reading fully six weeks later. So, swallowing hard on all long words and 99% of all known germs (the majority of which share with us the delight of a Soho head office) eyes down for a day in the life of Friends of the Earth:

It is Monday February 14th, 1972, the sun is shining and one hundred and twenty three unopened letters await the arrival of the three Friends who will spend most of their day attempting to answer them. We have all been told that there's a National State of Emergency, the miners are to blame, the Government's to blame, society's suffering, industry's innocent and apart from not being able to make the lights work it's nothing to do with us. All we have done is to believe that it's a good idea to rely more and more heavily on more and more power. After having been taught to leave lights on and having discovered the unparalleled virtues of electric toothbrushes, we've now got to turn the lights off and the toothbrush doesn't work. The Department of Trade and Industry, which has always left its lights on, terrified of hiding them under a bushel, wants everyone to turn off at least one light bulb. The only difference between this and the conversion of Paul on the road to Damascus is that given a few more miles and a couple of percent on to the Government's offer, Paul's going to change his mind again. Christina and Angela are answering the letters.

Simon Millar is looking up the latest figures on known world coal reserves.

At the present rate of usage coal could last 900 years: with the current small rate of increase of the amount used each year, coal will last nearly 600 years. So that's not bad—or is it? What's going to happen to the rate we use coal when we run out of other fuels.

The sun is still shining, but with the office full of people answering mail, planning campaigns, catching up on research work and chatting about energy supply, no one has mentioned nuclear power. Strange that. A year ago, Simon, Tina, Angela or Jon would have chipped in something about nuclear energy. They're quiet about it now not because of the research they've done into radiation hazards (although that's enough to worry anyone) but because pinned up on a wall is the second Law of Thermodynamics.

"All energy eventually ends up as heat". The trouble with that law is that it is not man-made, and can't be broken. So with energy the problem is not just one of running out of "safe" fuels like petroleum, but also one of not knowing how long we can carry on doubling our energy use without producing enough waste heat to upset world climate. As soon as you get into a talk about world climate paradoxically you leave a lot of people cold. The question seems just too great, but then so is our ability to destroy things by refusing to care for them.

The world has always been to do with resources, and the survival of any of us has always depended on how sensibly we use them. If the miners' strike has done anything to make us realise how dependent we are on raw materials, and if it has made even a few of us question whether our use of them is very sensible, then it will at least have prepared us for problems we shall all have to face later.

The mail's almost done now, and Simon, Angela and Peter are preparing three different campaign schedules. By the time this article (or diary?) is read, things will have moved on quite a bit in each of FOE's three main campaigns. On 24th February is (or, by the time you read it, "was") National Parks Day, and Simon, who prepared most of our mining evidence to the Zuckerman Commission, is painstakingly sending notices and posters to the headquarters of the thirty-odd organisations holding public meetings on that date. That's Friends of the Earth: 50% academic

research; 49% stamp-licking; 1% excitement. If only people knew...

Angela's arranged a deputation to go to the DTI on March 1st to argue the toss about Endangered Species Protection. We've done the homework, prepared the papers, organised the Adopt-a-Species Campaign, and now it's all up to Anthony Grant and the DTI. If they care about snow leopards and blue whales (an awful lot of politicians pretend to—when it suits them), then the Government will agree to introduce an Endangered Species (Importation of Products) Bill, banning the importation of products made from these animals. If you haven't heard what the Government intends to do, ask Anthony Grant, Under Secretary of State, DTI, 1 Victoria Street, London SW1. Send copies of your letter and reply to us at 9 Poland St., London W1.

Peter Wilkinson is getting ready for the big one. On March 25th over 500 groups up and down the country will be taking back whatever excess packaging they have collected in the last month. Administratively, Pete's task is nigh-on impossible, but then so was the National Schweppes Delivery last October, and he organised that. Packaging Day will have come and gone before the April *Ecologist* appears, and you will have been able to gauge its effect yourself. Rick Walker and the likely lads of Liverpool FOE, Colin Clews up in Durham, and thousands of Friends everywhere will have done their stuff. Oliver Thorold will have led the FOE contingent to the Department of the Environment Packaging Conference on March 28th. A government decision for more consultation or a working party will be made, and everyone will be content that they have cared about an important problem.

Except Friends of the Earth. We'll come back to Poland Street and try to decide what to do next in these campaigns, what others to wage, and to devise more ways of focusing attention on problems of resources. Killing off animal species, destroying national parks, and throwing millions of tons of useful materials away are all symptoms shown by a society which has forgotten the limits to which everything is subject. FOE must not be as absent-minded.

The sun is still shining. I hope it shines tomorrow.

Graham Searle



Books

Save our Soils

SOIL CONSERVATION by Norman Hudson, B. T. Batsford Ltd., £4.50.

Norman Hudson is Head of the Department of Field Engineering and Director of Studies in Soil Conservation at the National College of Agricultural Engineering. His book is a manual for students of soil conservation and a reference work for conservation officers in the field. Much of it is rather technical, for of all the professions connected with the protection of the natural environment that of the soil conservation officer is closest to that of the civil engineer and his questions are answered with a slide rule and sets of tables. It is not enough to observe that a hillside may be subject to erosion during heavy rain, or that the soil on a plain may blow in high winds. The conservationist must be able to calculate the precise effect of the kind of rain or wind most likely to be encountered on soil of that particular type with that degree of exposure. From this he must be able to tell what measures to take. If he is to construct terraces or channels to carry away surplus water he must know the dimensions and location of these. If he is to plant vegetation he must know what vegetation. He must recommend whether the land may be farmed and in what way.

Much of the book is devoted to the mathematics of solving such problems, with examples worked through to show that it is really not quite so formidable a task as it might seem. I wonder sometimes about the mathematics of this kind of operation. It has some similarity to the calculations performed by ecologists studying ecosystems and ecological energetics. It all sounds very plausible and the logic is faultless, but it is founded on quantifications derived from estimates and rules of thumb. We

may have no other way of allotting numerical values to such qualities as the erodibility of a soil or the erosivity of a rainstorm and the eye, hand and judgement of an experienced specialist may be more accurate than they sound. Anyway, in the case of soil conservation, they work well enough, when they are applied. It is in deciding whether or not to fund a conservation project that the most difficult decisions are made and the steps by which the officer decides which is the most urgent task, costs it and then multiplies his costing by a factor laid down by the funding authority so that he can present it to them as the satisfactory result of a cost/benefit analysis reveal the author's experience of bureaucracies.

The importance of soil conservation throughout the world cannot be questioned and the book begins with a summary of the present world food situation in relation to the productive capacity of the world's soils. The author rejects attempts to achieve quick increases in food production based on technologies that leave out of account the condition of the lands that must support them. The Green Revolution cannot work, food output cannot be intensified on existing farmlands and far less can new lands be brought into production unless their stability is ensured and maintained. There are no short cuts and we should be warned by the fact that back in 1934, 75 per cent of the farmland in the USA was recognised officially as suffering from erosion, due mainly to bad, extractive farming.

At the other end of the story, and of the book, there is the need to control the pollution caused by erosion. Soil in the wrong place is a pollutant and so are the fertilisers it may hold and the pesticides that coat soil particles.

Soil Conservation is primarily a book for the specialist, but the wisdom and plain common sense, acquired over many years of practical experience, that

have gone into its writing, should give it a rather wide readership among those who wish to understand what soil conservation is, why it is necessary, and how the problems it presents are solved.

Michael Allaby

Destruction of coral reefs

LIFE AND DEATH IN A CORAL SEA by Jacques-Yves Cousteau with Philippe Diolé. Cassell and Co. Ltd. £2.50

and
THE STRUGGLE FOR THE GREAT BARRIER REEF, by Patricia Clare. Collins £2.50.

Both these books deal with the largely unknown world of coral.

Jacques-Yves Cousteau writes as an explorer-adventurer passionately curious about undersea life and deeply concerned for its future. "The reason for my concern is obvious. I have decided my life to the sea. Certainly I will not allow it to be dirtied, degraded and polluted without protest." Cousteau and his close associates have been diving for thirty years during which time they have pioneered many important techniques of underwater exploration and have made many significant oceanographic and biological discoveries. For sixteen of those years they have on various occasions dived in the coral seas of the Red Sea and Indian Ocean. *Life and Death in a coral Sea* is an account of their most recent voyages through that area—made between March 1967 and February 1968 on the research ship "Calypso" with a group of fellow divers, oceanographers, biologists, engineers and cameramen. Despite its lavish illustrations, the resulting book is a sad one to read. It succeeds all too well in conveying the beauty of the coral seas and the tragedy of their destruction.

Patricia Clare's book *The Struggle for the Great Barrier Reef* is aimed at the same wide audience as *Life and Death in a Coral Sea*, but lacks Cousteau's commitment and the breadth and depth of his outlook. Its subject is not so much the reef's life forms as the "human story" involved in its destruction. This is a potentially fascinating subject which is slightly trivialised in earlier chapters (which devote large hunks of prose to the description of the physiques of all the

male protagonists of the drama). Later on in the book the plot slowly emerges and diligent readers are rewarded with disturbing information about the inadequate steps being taken to halt the decline of the Great Barrier Reef.

Anyone who considers the decline in coral communities to be a mere side event in the Great Pollution show would do well to remember that the coral seas cover an area of the planet equivalent to twenty-five times that occupied by the United States and that they have been described as "the most complex and perhaps the most productive biological system in the world".

High levels of complexity and productivity are no guarantee for the survival of a biological system—particularly when it is faced with some of the simple and less productive actions of man. Indeed, the very complexity of coral communities may have facilitated their destruction by impeding our efforts to understand them and by offering such a multiplicity of options for attack. We remove from the coral seas large quantities of a wide range of things, including: sand, lime, minerals, oil, lumps of coral, shellfish, big sportsfish and lesser foodfish. We add to the coral seas a host of substances (including oil, pesticides, sewage, agricultural fertilizers and industrial wastes) without knowing much about their individual effects and knowing even less about their combinatory, synergistic effects. Coral communities are particularly vulnerable to these assaults as coral itself is fixed and cannot move away from sources of discomfort and because the complex web of coral life has innumerable links—only one of which need be broken for the rest to be adversely affected.

The coral seas respond to attack in a variety of ways but the end result is always the same: a desolate grey inert parody of the colourful bustle of a living coral community. The Red Sea is particularly vulnerable as, like the equally beleaguered Baltic, it is virtually landlocked and anything deposited in it tends to remain there. Cousteau considers the extinction of the Red Sea's coral life to be merely a matter of time but, in a wry aside, points out that the six-day war and the subsequent closure of the Suez Canal may have earned it a temporary respite. He also describes in some detail the decline of the reefs and atolls of the Indian Ocean. Even the isolated Maldiv Islands are already in such a

state that "thriving communities of marine life are now relatively rare."

The deterioration of the Great Barrier Reef is most famous for just one of its many aspects, the mysterious population explosion of the Crown of Thorns starfish—a species which was considered a rarity as recently as the mid-sixties. Scientists are still not certain why the explosion happened. They suspect that one, or more, of its predators was wiped out by the activities of man, thereby leaving the starfish free to multiply in a spectacular fashion and to destroy vast areas of the coral upon which it feeds. Clare seems none too optimistic about the future of the Great Barrier Reef. If her descriptions of the inadequacies of local and national politicians are at all accurate, one cannot do other than agree with her.

It is deplorable and amazing that we should have permitted such spectacularly beautiful and productive biological systems as the coral seas to fall into dramatic decline. God help the less spectacular areas of our oceans and seas. Our only hope is that public awareness of the problem facing the coral seas will expand at a greater rate than it is at present. Both these books—Cousteau's much more than Clare's—will aid such an expansion. Perhaps the last word should be Cousteau's:

"What if the precarious equilibrium that exists among marine life forms is shattered before the scholars and researchers are able to study and understand the coral world? If this happens, it will have been the fault of our generation; and the generations to come will surely never forgive us."

Colin Moorcroft

Scientists and Sinners

ORGANISM AND ENVIRONMENT, *A Manual of Quantitative Ecology*, by Reznat M. Darnell, W. H. Freeman & Co., \$5.75.

ECOLOGY CRISIS, *God's Creation and Man's Pollution*, by John W. Klotz. Concordia Press, 60p.

A few years ago ecologists were the poor relations of most other scientists. They studied and practised their obscure and rather technical branch of the life sciences at a few research stations and one or two universities. Even the name of their discipline was unknown to the general public, so that

it could be mentioned only if accompanied by a dictionary definition, politeness requiring the guest to forestall his host's rush to the bookshelf. Then the bombshell burst. The ecologists began to observe disruptions in the systems they studied and they looked outside them for a cause. The result, as we all know, was their step-by-step unveiling of what we know now as "the environmental crisis". They applied to the world as a whole the techniques they had developed in ponds and woods. It is a pursuit fraught with dangers but it has yielded vital information about the relationship between man and his global habitat. It has traced his disruption of ecosystems to activities that may be interfering with the life-support systems upon which he himself depends.

So ecology has become fashionable and the ecologists are our prophets, threatening hellfire and damnation and now, with the publication of *A Blueprint for Survival*, pointing the way to salvation. The theological parallel is not fanciful, for the movement has given rise to a new philosophy and should a new major world religion be about to emerge—and that is far from impossible—it will be ecology that provides the ethical and philosophical base.

The curious thing is that the science of ecology itself has not become really popular in the way that astronomy, say, was popularised. People attend lectures and read books on the threats to man, but there are few if any ecological writers explaining to the layman just what it is that ecologists do. There are countless books that will tell you, in more or less technical language, about the life cycle of a star in a galaxy, but there are few that will tell you about the life cycle of a frog in a pond.

What has happened, of course, is that the word "ecology" has undergone a subtle change of meaning. To the layman it suggests population (human), pollution and the depletion of resources. In a way this is what ecology is about, but its elevation is a source of annoyance to some of our more staid scientific writers, who were brought up to regard all biologists with a certain disdain. They dismiss the ecological warnings as alarmist and, dare I suggest, vulgar? We may ignore their complacency but there is a real risk that we may move too far from the study and application of the science with which it

all began. For this reason, *Organism and Environment* is doubly welcome. It is welcome because there is a need for a well constructed manual of quantitative ecology and it is welcome because it can be used to demonstrate ecological principles and techniques to students who may never become professional ecologists but for whom a working knowledge of ecology may be important. Had there been more study of ecology in the past we might be better off now.

The manual consists of 25 experiments, in five groups, covering morphological ecology (the adaptation of organisms and their response to their environment), physiological ecology, behavioural ecology, population ecology and community ecology. Each experiment is preceded by an explanation of the phenomenon to be observed and the principle to be demonstrated and the supporting diagrams are of the standard we associate with the publishers of *Scientific American*. The experiments are complete with work sheets for recording results, and each experiment can be used as a point of departure leading to the study of other organisms and other environmental regimes.

In his introduction Prof. Darnell accepts the close connection between the principles of ecology and the human environmental crisis. If we take this connection further we find ourselves back with the philosophers. Dr Klotz approaches from the other direction. His aim is to explore, if not the philosophy, then the theology of the environment.

Much of the "eco-philosophical" debate concerns itself with the historical role of Judaism and Christianity. It is central to the Judaeo-Christian belief, so runs the argument, that God gave man dominion over nature so that it might serve him. This suggests an opposition between man and nature which man is entitled, by divine right, to exploit. The debate is somewhat sterile. That the idea of a division between man and nature exists is undeniable but at the moment it is more important to overcome than to analyse it, or to defend Christians from an attack that may be more imaginary than real.

In the event, Dr Klotz deals only very superficially with the theology. Most of his book is the usual tale of the death and decay which all around he sees. It is valuable to gather together

the many strands of the crisis in a book of this length, but it would gain in cohesion were he to relate them more closely so as to reveal common patterns and, perhaps, a cause. He mentions population and industrial growth but he seems not to connect this either with the dogma of "go forth and multiply" or with the root of the crisis. The book is edited by Robert Waller, who contributes an excellent introduction and from time to time it is possible to detect the paragraphs he has added to include Britain in what began as an American book. Mr Waller's additions show a much deeper understanding of the subject and the book is better for them.

We are moving, at last, away from the age of "eco-doom" and into a more constructive consideration of solutions and their application. Whether or not the Christians are to blame, our retreat from the brink of catastrophe will call for more than "the Christian environmental ethic outlined in the Bible", pressed on us by Dr Klotz. Man's predicament is unprecedented. It is as absurd to criticise our ancestors for having failed to foresee it as it is to look to them for our salvation.

Michael Allaby

ORGANIC FARMING COURSE

Surrey County Council, Ewell County Technical College, Department of Biological Sciences
Principal: T. A. Buchanan, D.S.O., M.C. Head: L. G. North, B.Sc., M.I.Biol.

A BIOLOGICAL APPROACH TO SOIL HUSBANDRY. In conjunction with the **SOIL ASSOCIATION** it is intended to hold a course on the above topic at Ewell County Technical College in the week July 10-14 1972. The course will take the form of lectures, discussions, demonstrations and a visit to an organic farm and/or market garden.

It is hoped to cover the **PRINCIPLES, VARIETIES OF PRACTICE CONSISTENT WITH PRINCIPLES;** and **ECONOMIC FACTORS** of this method of husbandry.

The cost will be in the region of £10, plus accommodation, at a further cost of approximately £1.15 per night. Canteen services are available if required at £1 per day.

Further information will be sent to those who have expressed interest by returning the tear-off slip at the foot of this notice, or by writing to:

Head of Department, Department of Biological Sciences,
Ewell County Technical College, Reigate Road, Ewell, Surrey. Telephone 01-394 1730/9

I am interested in attending the course 'A Biological Approach to Soil Husbandry' at the above college on July 10-14 1972.

Name..... Address.....

..... Telephone.....

STOP PRESS: Numbers for this course are restricted to 120 and we have almost reached the limit. However, so that those who are interested will not be disappointed it is intended to arrange another similar one-week course from April 9-13 1973. Please write to the above address for further details.

The Soil Association campaigns for better farming, to produce better food, to promote better health.
Walnut Tree Manor, Haughley, Stowmarket, Suffolk.

Feedback

1 Houston futility

For those interested in ringways, Houston claims the best ringway system in the world—300 miles of it already constructed and another 400 on the way. The system was built to serve a population of only 2 million, but during rush hours they rival anywhere in the world for congestion and multiple pile-ups.

And at the rate of population growth, city officials say that the system will be totally inadequate when it is completed in 1990.

Source: *London Amenity and Transport Association*, Newsletter No. 13

2 The cost of unwanted children

There are 150,000 unwanted children born in Britain every year. They cost the taxpayer £300,000,000 in supplemented benefits, child care, temporary accommodation and sickness benefits during their first 16 years.

These figures emerge from a political and planning report published on the 28th February. According to the report, every pound spent on family planning could save Public Authorities up to £100. Illegitimate children are the most costly: they are 4½ times more likely than other children to come into the care of Public Authorities, be placed in foster homes, or to need psychiatric help. Each illegitimate child will cost an average of £4,050 over a period of 16 years. This compares to the £34 it is estimated to cost in family planning services to prevent a birth: a cost ratio of 128:1.

Source: *Observer*, 27.2.72.

3 World food prospects

Output of agricultural products in the world's developing countries rose three per cent in 1970 and food output was up four per cent over the year before.

This was reported in the annual review, *The State of Food and*

Agriculture (SOFA), published in November by the FAO.

While the developing regions were enjoying an expansion in production, said SOFA, there was, however, no per caput increase in agricultural goods and only one per cent gain per person in food output. Further, in the developed countries—primarily Western Europe, North America, Australia, New Zealand and Japan—both agricultural and food production stood still compared with 1969.

For Eastern Europe, 1970 was a relatively poor year for agriculture with total production down one per cent. But the USSR showed a gain of nine per cent after a drop of almost four per cent in 1969. China—in the absence of any published official statistics—was estimated by SOFA to have harvested 230 million tons of grain in 1970, compared with some 220 million tons in 1969. Rice production was calculated at around 100 million tons, five per cent higher than the year before, and that of wheat at a record 30 million tons, registering a more than five per cent gain.

Worldwide, agricultural production was up two per cent, SOFA said. Fishery production, it added, the growth of which had slowed in 1969, again accelerated in 1970 (four per cent), and forestry production is estimated to have continued to expand at a relatively slow rate (one per cent).

On a regional basis production in the developing countries was given as follows:

In the *Far East* including South and Southeast Asia, total agricultural production increased four per cent and food output rose five per cent. Per caput this represented gains of one and two per cent, respectively.

For the *Near East*, output in all major countries, except Turkey and Afghanistan, remained virtually stationary or fell. Agricultural production dropped about one per cent and overall food output was unchanged. Per

person this meant declines of four and three per cent, respectively.

In *Latin America*, while agricultural output went up two per cent, food production increased five per cent. However, according to SOFA, the latter jump reflected the "remarkable" increase in Cuba's sugar production, which is mainly for export. In the rest of the region combined, food production increased three per cent, or roughly in line with population growth.

For the developing countries of *Africa*, production of agricultural and food products rose two per cent, "although there was a considerable but still incomplete recovery of production in the Maghreb (northwest African) countries." Agricultural production per person remained stationary, and for food it dropped one per cent.

Source: *Ceres*, Nov.-Dec. 71.

4 Dutch church backs Euthanasia

A group of doctors in Holland have drawn up a document in favour of "passive euthanasia". They consider that it is not morally necessary to perform an operation or to give treatment to patients in great suffering, for whom there is no chance of a cure.

This standpoint has now been accepted by the synod of the Calvinist Netherlands Reformed Church. "Passive euthanasia" is now regarded as acceptable in the case of malformed or handicapped children "who are unable to communicate with the outside world", road accident victims whose brains are dead but whose bodies are kept alive mechanically, and old people who are dying a slow and painful death.

Needless to say, the report has been criticised, mainly on the grounds that it does not draw a sufficiently clear line between passive and active euthanasia. Nevertheless it points to a changing set of values—and a very welcome one. The myth of the sanctity of human life is one which must be exploded. To keep

people alive in intense suffering should be regarded as infinitely more immoral than to let them die.

Source: *The Times*, 24.2.72 and editorial comment.

5 Heavy metals and soft drinks

The metallic food poisoning caused by metal drink pourers, which was found and investigated by the Westminster Public Health Department, led to considerable publicity and was also mentioned on "Braden's Week". After seeing the case on television the public health officers in Redditch decided to make tests at three public houses picked at random. They found dangerously high levels of copper and zinc in cordials poured from bottles with brass optics. The Chief Public Health Inspector, Mr A. Summerfield, has stated in his report to Redditch Urban District Council that more than 50 times the recommended amount of copper and nearly 20 times the recommended amount of zinc were found in two samples of orange cordial. Public health inspectors contacted immediately all the local public houses, clubs and breweries warning them not to use the metal pourers.

Source: *Environmental Health*, February 1972.

6 Farmers defy Marxism

The small farmer behind the Iron Curtain: Marx regarded peasants as "a class of barbarians". His plan was to expropriate their land and use the rent for state needs. He regarded the concentration in agriculture, as in industry, as inevitable and desirable. His schemes for remaking society included the "scientific" cultivation of land by armies of labourers who would be practically indistinguishable from factory workers.

As a result of the Polish implementing these plans, one million people have been urbanised in Poland since 1945; but the policy is failing: there are still three million peasants in Poland, some with holdings of as much as 250 acres.

In Yugoslavia there are 2.6 million private farms in spite of the fact that in Hungary, Czechoslovakia and Bulgaria 84 per cent of the land now belongs to the state or collective farms. Peasants still produce a very large percentage of food. Private farms account for 20 per cent of

production in Hungary, and 10 per cent in Czechoslovakia; 25 per cent of meat and wool and 33 per cent of eggs in Bulgaria.

Source: *The Guardian*, November 30, 1971

7 Our gastronomic future?

It has been suggested by researchers in the USA that the common earthworm could be farmed. This would contribute towards solving a shortage of animal protein and would provide a method of disposing of the ever increasing amounts of animal and human waste.

Source: *Farmers Weekly*, 16.4.71.

8 High time too!

Scientists found several years ago that feeding a high energy diet to animals which are deprived of exercise results in a high fat/protein ratio, approximately 3/1 (as compared with 1/3 in ranging animals free to select their own food), and that this is low quality fat (obesity) lacking essential fatty acids which we need for cell growth and maintenance. (This may be relevant to the epidemic of coronary thrombosis which now appears in ever younger patients.) It is now over two years since Dr Michael Crawford summed this up in a letter to *The Lancet*, and now at last the Meat Research Institute announces a new project to examine the consequences of restricting the movement of animals during growth, stress produced by overcrowding animals and its effect on muscle metabolism and therefore meat quality.

Source: *The Farm and Food Society*, February 1972. (Newsletter No. 17)

9 Nuclear-powered hearts?

Doctors on both sides of the Atlantic are working on the development of nuclear-powered hearts.

According to Dr Cooper, Director of Washington's Heart and Lung Institute, experiments are successful. In six years' time these devices should be available commercially. They work for about 10 years. They are made of stainless steel and brass and weigh from 6 to 7 lbs. as compared to the normal 10 ounces of a male heart or 8 ounces of a woman's.

If this is a scientific answer to the rising incidence of heart diseases, then I suggest that science be abolished

forthwith. The nuclear-powered heart is an absurd and laughable gimmick and if our scientists do not accept this they run the risk of being totally discredited. The correct scientific solution to the problem is to determine the causes of heart disease and prescribe the life style in which it is reduced to a minimum.

The development of nuclear-powered hearts is an attempt to adapt to pathological conditions rather than prevent them from occurring. It is what Stephen Boyden calls "pseudo-adaptation."

Source: *The Evening Standard*, 3.3.72 and editorial comment.

10 700,000 Heroin addicts in US

The number of heroin addicts in the United States could now total 700,000—more than double the previous figure, according to Republican Senator Charles Percy, in Washington.

He said figures given to him by officials of the Bureau of Narcotics and Dangerous Drugs put the total number of known heroin addicts at 560,000, but information given to him by an economist indicated the total might be as many as 700,000.

Source: *The Evening Standard*, 3.3.72.

11 Yanks made obese by English food

The Klaxon bleats in the air base and scores of ground crewmen make a mad dash to their assigned posts. Such a scene was a familiar and thrilling spectacle during World War II. But if such an alert were sounded today at American air bases in Britain, the spectacle would be pure farce. The reason? Many ground crew members in England are so fat they couldn't run from one end of a bomber to the other without collapsing.

The source of the added tonnage is English food: greasy, starchy, sweet, and much to the taste of Yankee airmen. One prime offender is believed to be fish and chips, and the dish was recently forbidden at two bases and numerous private fish and chip shops have been put off limits. A spokesman said hundreds of crewmen throughout Britain would have to say "bombs away" to their blubber.

Source: *Rodales Health Bulletin*, Vol. 9, No. 23

Letters



The mind and the environment

Sir,

Your interesting identification of "mind" with cybernism raises further questions about models of the individual's relationship with his environment.

The basis of cybernisms seems to be a hierarchy of systems organised by control mechanisms. In modern Greek the word cybernism means government and this clearly is a related idea. In cellular units it is clear that genes record the patterns of protein molecules and that amongst these enzymes rank. How the enzymes arrange themselves so effectively and consistently is a matter that biology takes for granted. A hierarchy of systems is seen to be present and so are enzymes and out of this conjunction organisms happen by some odd alchemy.

To form an idea of an organism we require a model of its relationship with its environment. In nearly all organisms the management of this relationship takes place within the organism. The plant takes in light, carbon dioxide, water, etc.—and orders these environmental elements inside itself. The animal takes in other nutrients and orders these to form its internal environment and the structures which surround it. All of this ordering of systems takes place within the anatomies concerned—each of which, of course, has its relationship with a place or habitat. The relationship between the organism and the environment requires cybernisms or cybernesis, according to which word one prefers to use. In a jelly fish or an acorn worm or any similar lowly creature, with a poor sensory endowment, this cybernesis has little in it which could properly be called mind.

When the fully developed mind is interpolated into this situation, the model of the relationship between organism and environment changes dramatically. Now, instead of the environ-

ment being operated upon within the confines of anatomies, the environment outside of anatomies is dealt with.

Very few species operate upon the environment which is external to their anatomies. Birds build nests, spiders spin webs, beavers make dams and so on. We call these operations instinctive. They are compulsive, they are not typical of the effect of mental endowment upon the environmental relationship. Chimpanzees use small tools and this is the beginning of a mental effect.

In the case of man, the environment within him is dealt with as it is in lower organisms. In addition to this regulation and homeostasis of his internal environment, man, in virtue of this neural endowment operates upon his external environment also. This goes far beyond the nests of birds, the webs of spiders or dams built by beavers. Man not only manipulates the inorganic world about him searching for energy and other resources, he also manages the breeding and the habitats of other species. These remarkable effects stem from men's mental endowment or mind.

One could go on to say that the mind of man is derivative from the basic cybernisms which distinguish organisms. Only if these are preserved to operate a satisfactory biosphere can the mind of man have any future. Equally the mind of man can only have a future if the numbers in human populations (which create and support the function of the human mind) are limited to the point at which the biosphere and its contained cybernisms can be preserved.

The point of balance about which the whole functions as an open system is the clue to the requisite steady state. Only in virtue of such a state can the biosphere succeed in perpetuating and developing itself in an entropic environment. Through most of the biological time cybernisms have been directed to dealing with the environment contained within anatomies. With the interpolation of the human mind a new need arises for cybernisms which will allow the external environment of human organisms to be satisfactorily governed. Kenneth Barlow, The Old Forge, Great Finborough, Stowmarket, Suffolk

Avoid ring pollution

Sir,

I thought that you might be interested, amused (or both), to know that Idris Ltd. (manufacturers of canned soft

drinks) have taken to printing on some of their can tops the words, "Avoid litter—put ring in empty can"—As if that would lessen the litter problem!

Admittedly, if seen on a rubbish dump or discarded in a ditch, etc. the sight of the can only, instead of the can and the ring, may be preferable. But presumably the intention is to ease the mind of the buyer—who after placing the ring in the can, can feel satisfied that he is not a litter lout, as he tosses the empty can into the ditch!

It would be much better, if it read, "Avoid litter—place can in bin", or still better, "Avoid litter—do not buy can in first place!"

But now that the cigarette has been reduced by a compulsory government health warning to a mere "cancer stick", surely the "tin can people" would appreciate a similar generous ruling by the government, to the effect that they should carry litter warning on the cans? Yours faithfully,

Mr D. Solman,
30 Hall Road, Hull, Yorks.

Worms' friend, man's enemy

Sir,

With regard to the article "We Need These Soil Tillers" (Feb. 1972), it is also worth mentioning that the herbicide, Paraquat, is lethal to human beings. Accidental ingestion of even small quantities of the agricultural brand is invariably fatal. It is necessary to bear this in mind when handling this substance, lest its advantages for the earthworm be offset by its disadvantages for man.

Yours faithfully,
W. M. Hamilton,
4 Belhaven Terrace, Glasgow W2

Marx and ecology

Sir,

Mr Jarvis in your issue of February 1972 is mistaken. In my article "Marx and Ecology", I was not quoting from Marx's *The Critique of Political Economy* of 1859, nor from Engels' *Conditions of the Working Class in England in 1844*, but from Engels' *Outlines of a Critique of Political Economy* (1844), as quoted by Anthony Flew in his Pelican edition of Malthus (pp. 35 and 51). I regret that the title was not given in full.

Yours faithfully,

G. N. Syer,
321 Richmond Road,
East Twickenham, Middx.

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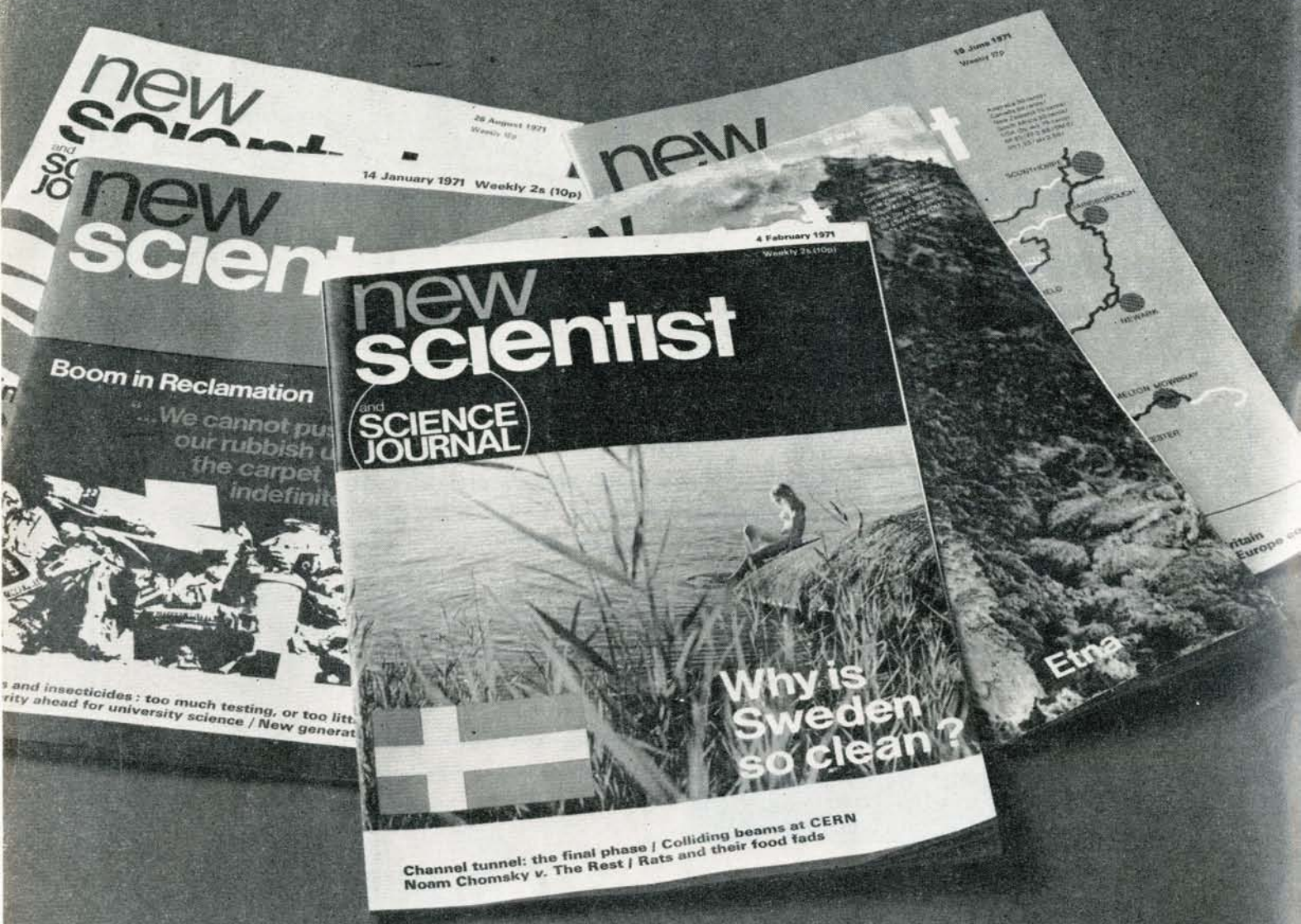
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