The New Ecologist

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Whither now radioactive waste? · Cancer Cover-up Microprocessing & Unemployment

A new Homestead Act

THE NEW ECOLOGIST WISHES ALL ITS READERS A PEACEFUL CHRISTMAS AND A HAPPY NEW YEAR

THE HERETIC

He was accused before a public meeting
of having striven to incite the people
simply to shun Irrational Consumption —
in short, to bring all Progress to a stop.

And for no cause. He made no claim for pay,
or any increase, or improved conditions.
Now, if he'd called a strike, or something like that . . .
but since he hadn't it could make no sense;

and there were those who called out for his blood
(voices were few, but they were very loud),
and very reasonably, too, of course:
how could they just switch off the great machines
that were the heart and kidneys of their world?

Conclusions were foregone, of course. They carried
the motion overwhelmingly. They took him
(during a stoppage on the assembly lines
caused by the overloading of some system)
up to a nearby hill and made an end
of him who might have brought them to their senses.

A huge crowd watched in silence, and although
someone cried Stop, nobody seemed to hear.

Eric Millward

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This issue's cover: Stewart Lowdon

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Editorial

Chips on our shoulders

The most disturbing feature of the growing debate over microprocessors is that it has come ten years too late. Like it or like it not, the microprocessing revolution is already upon us. To its devotees it is 'Man's greatest leap forward', 'almost as significant as the development of the wheel', and the 'most influential advance of the twentieth century'. If properly harnessed, they believe, it will rescue us from the present recession; make available a flood of new goods at give-away prices; herald a new age when drudgery will be banished from the workplace and answer the conservationist's prayers for a technology that is economical with energy and resources. But how well-founded are these claims? Are we on the brink of a second industrial revolution? Or will microprocessors prove a passport to unmanageable dole queues, a society based on a technocratic elite, and (ironically) a far deeper depression in the not-too-distant future?

Already microprocessors have taken their toll on employment in manufacturing and communications industries throughout the world. A report from the Science Policy Research Unit at Sussex University forecasts that by 1990 microelectronics will have put four to five million people out of work — and Colin Hines in his article, *The Chips are Down*, warns that the figure could be even higher. The list of jobs that could, in theory, be replaced by microprocessors is long and alarming — from postmen to filing clerks, to warehousemen, proof readers, secretaries and many others. The silicon chip is so reliable, so cheap (and getting cheaper) and so versatile that it is becoming all-pervasive. 'We are in the age of the automated factory, the automated office and the automated farm,' Doug Hoyle told the recent Labour Party Conference. Just to generate enough jobs to keep unemployment down to its present levels will require a staggering six per cent growth rate — more than twice what Britain has achieved over the past decade.

Despite the prospect of mass unemployment — far worse than anything seen in the 1930s — the Government tells us that we have no option but to embrace microprocessors. 'If a given technology offers significant competitive advantages, then either we grasp the advantage or we do not compete at all, 'warns Mr. Booth, Secretary of State for Employment. Even *The Times*, normally so restrained, declared wildly that if we reject the microprocessor, Britain will join the ranks of the underdeveloped world. The choice is between two evils; either we accept the new technology and lose jobs through displacement, or we reject it and lose jobs through a wholesale loss of international competitiveness. Mr. Booth is quite clear which side of the fence he is on: 'There is no certainty about job loss if we do apply microelectronics. There is absolute certainty about job loss if we do not.'

Quite what was going through Mr. Booth's mind when he made that statement it is hard to determine. At best his argument is based on the assumption that microprocessors will generate such massive new markets that the industry itself will be able to absorb the unemployed. At worst on the naive assumption that because past fears that automation will lead to mass unemployment have not (as yet) proved well founded they won't in the future either. In claiming that the new technology will develop its own markets, Mr. Booth is correct. The latest U.S. figures suggest that 'the application market for microelectronics is equivalent to thirty-eight per cent of the world's present economy.' The trouble is that each application gradually, then rapidly, leads to further job loss. If the microelectronics industry itself decides to automate its factories, how many people will then be employed?

Mr. Booth glosses over the very real possibility that Trade Unions will resist the sacking of their members in the event of automation — something that has already happened in Japan where many car manufacturers have been forced to retain their workforce despite their plants being fully computerised. So far they have warded off mass redundancies by doubling their output, but that expediency cannot be kept up forever. In Germany events have worked out less happily: in the metal-working and printing industries there have been bitter strikes in support of job-supporting guarantees from companies introducing computerised equipment. And as we go to press, there is the possibility that one of Britain's most revered institutions, *The Times*, will be forced to close because of crippling industrial disputes over the introduction of chip-based typesetting and printing machinery.

If Britain is to have its microprocessing cake and keep on its workforce then we require nothing short of a second industrial revolution that will boost production levels far above anything attained in the last thirty years. That revolution must be achieved in conditions that are less and less favourable to the industrial process: capital and labour costs are high; resources are scarce; society no longer has the cohesion to withstand massive upheavals; energy is no longer cheap or plentiful; and the biosphere is too degraded to tolerate yet another spurt of industrial rape.

Some people — and judging from the speeches at the recent Ecology Party conference, there are many ecologists amongst them — argue that we should welcome mass unemployment as a means of giving people the opportunity to develop skills and interests that are denied to them in the modern industrial state. Microprocessors will enable us to develop a humane and ecological society, in which drudgery and boredom will be removed from work. In seeking an alternative to our mass industrial society, chips will thus have an important part to play. Romantic neo-Luddite images of the past will never serve as a blueprint for the future; the halcyon days when peasants tilled the land, swigging their wine and singing songs, were not carefree but boring, repetitive and soul destroying. The

microprocessor, it is claimed, is a technology that will liberate us from that dismal past. (The drudgery involved in actually producing the chips is conveniently forgotten — but let that pass).

Like Mr. Booth, they argue that if we reject the microprocessor, then Britain will rapidly go bankrupt — deprived of vital foreign exchange earned by its export industries. In the transition to the ecological society, it is essential that we maintain and develop an industrial sector which is competitive — and today that means an automated sector. In *After Industrial Society?* (Macmillan 1978), J. Gershuny develops this idea and suggests that what will emerge is a dual economy, one sector of which will be highly automated and increasingly capital-intensive, and the other based on small-scale cottage industries. But will such a system work? And is it even desirable?

Many of those who support the idea argue that as the transition to the ecological society progresses, so the automated sector will gradually be phased out. Such an assumption appears politically naive. To finance those who are unemployed, let alone start cottage industries, the government will have to tax its profitable industries; the 'informal' cottage sector will thus become dependent for its very existence on the success of the 'formal' automated sector. If, on top of this, the craft industries are to use microprocessors also (to eliminate what drudgery remains), then the bond between the two sectors will be further strengthened. Will the two economies be able to exist side by side without one dominating the other? To partake in international trade, the formal sector will require some measure of centralised government: total dismantling of our present administrative bureaucracy is impossible. The danger is that the centralised government that remains will, by its very nature, be unable to tolerate an independent sector that it cannot control. As Professor Albert Cherns put it recently in an article in *New Scientist* (June 8th): 'The size of organisations and their centralisation owes more to governments than is recognised. The enormous growth of administration is in great part a response to, and a consequence of, increasing regulation. Much of this regulation has been to defend the individual against exploitation. But it operates so as to increase the power of government and of employing organisations and of unions. Together their tendency is to crush the independent and the awkward . . . what doesn't fit the procedures can't be tolerated.' Professor Cherns is quick to observe that nothing could be more 'awkward' than cottage industries, difficult as they are to tax and almost impossible to regulate.

Nor would it be possible under present economic circumstances for many industries in the formal sector not to encroach upon those in the informal sector. A recent cover-story in *Time* magazine provides an excellent example. It points out that the profit-margin per acre of land is so small that, to survive, the modern American farmer has no option but to increase the size of his farm — and its capital intensiveness. Inevitably it is the small undercapitalised farmer — the man who cannot afford computers to run his irrigation equipment or mix feedstuffs for his cattle — whose land comes up for sale. Faced by such economic pressures, talk of smallholdings operating alongside a highly automated agribusiness sector is moonshine. Unless the two sectors are to operate according to different economic laws, it seems inevitable that the informal sector will always fall prey to the market forces operating on the formal sector. All that the dual economy will have done is to institutionalise a technocratic elite which dominates the vast majority of the population whose only sin is to have been thrown out of work by a small silicon chip.

Frogmarched by social and political forces down the dismal road of economic growth, we are increasingly forced to choose between evils — and the further we progress, the more unpleasant the choices become. Our choice is no longer between full employment and unemployment, but between high unemployment and mass unemployment. And the only solutions we can provide threaten to further degrade our environment and create an elite in society the likes of which has never been seen before. Whatever choice we make our predicament gets worse and worse, and our options fewer and fewer. Each time we toss the coin, we know that in reality we are playing a depressing game of 'Heads you win, tails I lose'.

To be under no pressure to change its ways is perhaps the greatest luxury a society can enjoy. One cannot help but envy the Kung Bushmen of the Kalahari Desert who when asked why they did not take up farming replied somewhat quizically, 'Why should we plant when there are so many mongongo nuts in the world?' So too, Jean Liedloff, author of *The Continuum Concept*, often relates how during the two years she spent with the Yequana Indians of Venezuela, she saw the wheel being invented a dozen or more times. On each occasion it was consigned to the rubbish dump. With no concept of work, what need did the Indians have for a labour-saving device?

Modern man has long since fallen from such a state of grace — but the point is made. There is little to be gained by blindly following each new avenue of technical and scientific research, just for the sake of it. Surely we have the intelligence to stop and ask ourselves: 'Do we really need this knowledge? Will it be of any benefit to us? Would we not be better off without it?'' The development of microprocessors is a case in point. Certainly there are good uses to which they can be put — the National Coal Board has recently developed a machine that will both make the miners' life more comfortable and also increase safety, and nobody but the most ardent Luddite would dispute that such a development is wholly praiseworthy. But there is a world of difference between a machine that improves working conditions — and one that removes workers from them.

At a time of high unemployment, it seems the height of lunacy to further introduce technology that can only aggravate a situation that we are already finding it difficult enough to control. Surely we would be better off trying to persuade our competitors to adopt a worldwide strategy for *limiting* the capital-intensiveness of our industrial equipment. Then perhaps we could get on with the job of building a society where choice is no longer in the hands of market forces — but of people. its people.

Nicholas Hildyard

The Chips are Down

by Colin Hines

The effects of microprocessors on employment

Growing attention is being paid to the possibility of mass unemployment and one recent report receiving widespread coverage suggested that in the UK this may approach five million by the 1990s. Less publicity however is given to the technological advances in computers and other fields of microelectronics. These developments could well prevent the Government from ever solving the unemployment problem, could put back the clock for women's liberation, and could make the work of middle management and many professionals resemble that of a car assembly worker. Yet the key to these new technical changes is a minute computer called a microprocessor. In the form of a silicon 'chip', a microprocessor can be as little as one centimetre square, can consist of 20,000 components and often cost less than £5.

The Government's present industrial strategy relies heavily on using public money to encourage increased investment and modernisation in British industry. An industrial sector with renewed efficiency and competitiveness is then supposed to take full advantage of the expanding world markets that are expected to materialise once the long-awaited upturn in world trade makes its appearance. Britain will then grow its way out of the recession. This improbable scenario invariably ends in hazy pronouncements to the effect that this will solve our unemployment problems.

In essence, the equation appears to be: a more competitive British industrial sector plus world economic upturn, equals economic growth plus lower unemployment. This glib formula may in fact be a cruel deceit since the purpose of additional investment is usually to raise productivity which will reduce rather than increase the number of jobs unless suitably compensated by stronger demand and a huge increase in output. To prevent further unemployment, a staggering increase in industrial output will be required. A forecast by the National Institute for Social and Economic Research estimated that for full employment to be restored Britain's GNP would have to grow at 5 per cent per year for five years. This implies an annual growth rate in manufacturing and exports of an incredible 8½ per cent and 16 per cent respectively. As Kenneth Baker MP pointed out in *The Guardian* last year: 'to believe in the impossible and to hope for the unobtainable is no basis for a constructive policy'.

If Britain is to recover from the present recession the Government must be hoping for sustained growth at least on the scale enjoyed in the fifties and sixties. Yet the probability of a world recovery of this order now seems to be remote, since most of the growth areas which fuelled that boom are no longer expected to expand as rapidly again. During that era, over 80 per cent of all the fastest expanding products could be categorised into six areas: electronics, synthetics, drugs, agricultural chemicals, consumer durables and energy. In the West the market for cars, TVs, etc. has virtually stopped growing and the industries concerned will have to content themselves largely with the replacement market. (In the Third World, the growing demand is increasingly being satisfied by countries such as Japan and Korea.) Most large chemical firms producing synthetics, drugs and agricultural chemicals have accepted that growth rates will inevitably be slower in the seventies and eighties than they were in the fifties and sixties, owing to factors such as rising energy costs, saturated markets and increasingly stringent legislation concerning product safety. All this, along with such factors as falling rates of profit and the rise in company indebtedness has meant that over the last

decade industries in the USA, Germany and most other advanced economies have been gradually adapting their patterns of investment. OECD studies show that there has been a shift in emphasis away from the construction of new plant towards 'rationalisation' and 'replacement' investment within existing plant and factories. It is the use of computers and microprocessors which will enable such rationalisation to occur with a vengeance.

Chips take their toll

The speed, reliability and power of computers and cheap microprocessors have vastly increased the potential for automation. In the fifties and sixties it was only possible to automate at great expense for one specific task, and hence the product concerned had to have a steady, virtually guaranteed market, engine crank shafts for example. Now however with the introduction of microprocessors, automated robots can be used for one task, and then, should demand change, they can be reprogrammed for another; in some cases this takes less than half an hour. Mick McLean of Sussex University's Science Policy Research Unit sees this as the major new development in automation. The process is still expensive, but he is convinced that automation has finally come home to roost because the technology has developed to the point where it is often as flexible as the retraining of people.

Among the first casualties of automation are firms making mechanical precision watches, cash registers and telephone equipment. Digital watches, made in the United States have already had a shattering effect on the Swiss watch industry, forcing seventeen firms to go out of business, causing widespread unemployment and resulting in the transfer of this 200 million dollar industry to the States.

Employment effects of this kind have also been felt by the labour force in the States itself. For example cheap reliable microprocessors have made it possible to discard almost all the mechanical moving parts from cash registers and replace them with a microprocessor in the form of a minute silicon chip. The 1975 Annual Report of National Cash Register, the world's leading manufacturer, stated: 'we can now produce . . . microcircuits, not much bigger than the head of a pin, which contain up to 16,000 components. These replace mechanisms that require hundreds of individually mechanised parts and scores of space-consuming machine tools and manufacturing processes to produce them'. This has contributed to the fact that between 1970 and 1975, National Cash Register reduced its workforce in the manufacturing sector by more than 50 per cent.

In the telephone equipment industry, Western Electric, the manufacturing arm of American Telephone and Telegraph who supply the majority of the telephone systems in North America, has seen its labour force drop from 39,200 in 1970 to 19,000 in 1976. The rapid introduction of electronics has not only affected the manufacturing sector; Western Electric have estimated that it will also result in a 75 per cent cut back in the need for labour in fault-finding, maintenance, repair and installation work. All major telephone equipment companies in Europe are faced with the same problems of transition. In the UK, the number of jobs is expected to fall by 30 per cent between 1976 and 1979, despite a slower shift to electronic technology.

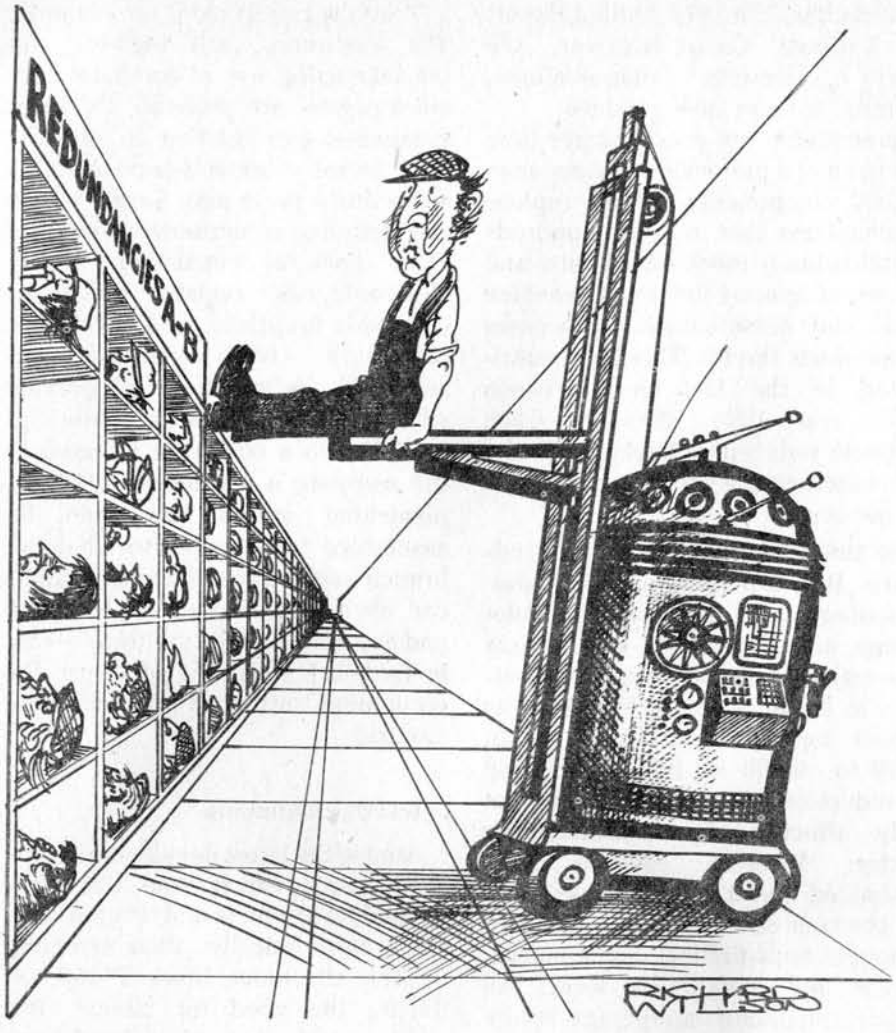
Whenever the employment effects of such industrial developments are questioned, the usual response is an expectation that the slack will be taken up by the service sector, which has been the major employment growth area since the war. Unfortunately the long electronic arm of the microprocessor is likely to have just as devastating an effect on those employed in services, as it has begun to have on those in the industrial sector. Over half the workforce is now employed in services of some kind, compared with 30 per cent in 1964. Cutbacks in Government expenditure have already reduced employment in the public sector, but all service industries will be affected by technical developments of a type normally chronicled only in such specialist technical journals as *"Computer-Aided Design"*, *"Microprocessors"* and *"Computer Communications"*.

Take the retail trade, for example. The electronic cash register and the increasing use of computers for stock control are probably the most significant introduction in employment terms since self-service stores some thirty years ago. Larger stores are installing computerised 'point of sale' systems consisting of an electronic cash register which not only adds up prices, and checks the customers' credit-worthiness, but sends its information in parallel with that of other check points and branches to a computer situated in the company's warehouse. The replenishing stocks can then be assembled to be taken to whatever branch needs them. These terminals can also keep records of how fast and accurately each employee works. In Denmark staff refused to use the equipment until such practices were stopped.

Latest developments

Among the latest developments are laser beams, which 'read' bar codes printed on products and 'ring up' the price automatically, thus speeding up the check-out process and reducing the need for labour. Bar codes could also save the labour involved in pricing each product individually since the price is shown at the point of display. Automated fork lift trucks and other materials-handling equipment will similarly speed up distribution until the day arrives when all that is left for the warehouseman to do is to ensure that the right load goes on the right lorry. These developments will clearly have some impact on the retail organisations introducing them, but their greatest effect will be felt by smaller retailers, unable to afford such equipment. They will not benefit from the lower wage bills that such innovations can bring and many of them may well be forced out of business.

Without doubt the most serious employment implications for the service sector will be the introduction of the 'word processing revolution' on office work in general, and secretarial work in particular. The introduction of computers, accounting machines, pocket calculators, etc. has already mechanised many of the information handling tasks previously performed by



clerical workers, but with the exception of small increases in productivity brought about by electric typewriters, dictating machines and copying machines, 'secretarial work' has so far escaped any fundamental transformation. Word processing systems, which are normally electric typewriters with the addition of a memory, are rapidly changing this. A 'memory typewriter' allows a typist to correct and edit previously typed work, without retyping the unaffected passages of text. More sophisticated word processing models enable a large variety of standardised letters and other documents to be automatically typed, leaving only the variable details to be filled in by the typist. In more advanced word processing systems, the typewriter is replaced by one or more visual display units, which are connected to a central computer with a very large-scale memory and centralised editing facilities. Documents are displayed and corrected using the screen and both intermediate drafts and final copies can be produced as required on a high-speed printer. Once a sufficient number of word processing devices has been installed letters need never be typed at the sender's office, instead they can be routed by the word processor over a telephone line to the recipient's word processor where they can be printed. The copies can be stored magnetically by both the sender and the receiver. This of course has implications both for postmen and other post office workers.

As these systems become more widely used, growing numbers of secretaries and typists will be made redundant, since two or three word processors can do the same work as ten typists. Investing in a word processor is fast becoming cost effective since for an outlay of £5,000 or less, a single typist can be replaced. The imminence of this change was summed up baldly by a Times article entitled: 'The Four Thousand Pound Typist-Substitute That Will Soon Pay For Itself'. For the roughly 800,000 people, mostly women, employed as secretaries, this somewhat chilling title is likely to foreshadow major social changes. This is because the growth of typing and secretarial work has contributed to the increase in employment for women and has been responsible to some degree for their growing independence.

Nor is it only the more repetitive tasks that will be affected; computers and microprocessors are gradually being introduced into the field of intellectual work. Take designing for example. It has been predicted that the 1970s will see a decline in the total number of draughtsmen and women and related occupations, since even a simple computer sytem can 'draw' 25 times as fast as a skilled person. Such applications will mean that these and other white collar workers will begin to experience the same problems and disadvantages that have long been the lot of manual workers whose working lives have been redesigned and adapted to fit the dictates of the increasingly expensive machinery that they use. For example, the need to make the optimum use of expensive, highly synchronised computerised equipment will normally require shift work or systematic overtime. Furthermore, work will be fragmented into less satisfying, more narrowly-defined tasks often paced by the dictates of a computer. Rapid innovation in computer technology renders old equipment redundant along with the knowledge needed to operate it, and this can lead to experienced staff being replaced by younger ones versed in the latest advances.

All this is not to say that a Luddite-smash-the-computer-response to these developments would be appropriate: the need to remain internationally competitive leaves us with little alternative but to increase their application, since most other leading industrial nations already make more use of computers and microprocessors than we do in Britain. In any case, some applications of microelectronics have resulted in welcome advances in such fields as medicine and communications and the most frequently stated advantage of automated processes is their elimination of many tedious and repetitive tasks. This in itself would be commendable if it were not for the fact that, as things stand, the people displaced

are given little opportunity for alternative work.

What is so disturbing is that so little thought is being put into tackling such structural unemployment. There are already 1,500,000 unemployed and past population growth will mean that at least an extra 1,500,000 will be seeking jobs between now and 1985. All that the Government seems capable of providing are short-term palliatives. Solutions such as shorter working weeks, longer holidays, earlier retirement, raising the school-leaving age, work sharing, overtime bans etc. have all been half-heartedly suggested. In practice the difficulties would be enormous. At present, for example, the possibility of a successful pay policy being agreed without the safety valve of overtime, is almost inconceivable. Nevertheless these solutions will have to form a major part of any effective strategy for reducing unemployment, and as such require a far more determined approach than any so far attempted.

Creating jobs

There is of course no shortage of work to be done. A huge number of jobs could be created by a more serious attempt to provide for unmet social needs. A recent EEC study *The Potential for Substituting Manpower for Energy* emphasised that the reconditioning of manufactured products that were built to last, would save energy and raw materials and would also create more jobs in the form of new and satisfying repair work in small workshops distributed throughout the country. The report showed that this change would provide more than enough jobs to compensate for those lost in the manufacturing industries and would also provide a more varied type of work less susceptible to automation.

On the rare occasions that the possibility of a growing number of permanent and increasingly embittered unemployed is discussed, the scenario usually invoked is one of violent social upheaval. Less speculative however are the crippling financial costs involved in supporting such people. Payments would have to be high, not merely for humanitarian reasons, but because without adequate benefits for the huge number unemployed, overall consumer demand would be insufficient to sustain our industrial system.

What has to be faced over the next few years is that vast sections of the industrial and service sector will be automated and millions may lose their jobs.

The Government's reaction

Up until June 1978 the extent of Government reaction to this specific problem was limited to the formation of one advisory party which has since reported to the Advisory Council for Applied Research and Development. The Council itself informed the Government of its findings early in October.

In June this year however, the Government made various announcements showing that they had begun to grasp the economic importance and social implications of the increased use of microelectronics. On the economic side, the Department of Industry will provide support for the industrial users of microprocessors and for the microelectronics industry itself. This followed a report to the Electronic Component Sector Working Party of the National Economic Development Office which identified three objectives for the British microelectronics industry: to support the United Kingdom user industry; to improve its own competitive performance; and protect national security where access to local technology is vital. The National Enterprise Board also announced plans to finance the setting up of a new microelectronic company from scratch, using a group of engineers, some British born, from the United States. At the same time as these announcements were made, Mr Callaghan instructed the Central Policy Review Staff to take the lead in studying the social and economic implications of microelectronics.

Welcome as these moves may be, the present failure of the Government to confront these fundamental structural problems adequately cannot be disguised indefinitely behind a smokescreen of short-term job-creation measures and North Sea Oil optimism. Neither will ill-considered prattle rejoicing over the decline of the work ethic and boring jobs be of the least help to those for whom the present reality of such changes is permanent assignment to the dole queue. There will be no easy, wand-waving solutions. Even the long-term palliatives suggested above are likely to flounder in the face of the seemingly insurmountable problem of who pays for earlier retirements, work sharing, more sabbaticals etc. It is likely that the miseries and upheavals of the 1930 depression will pale into comparative insignificance should Britain continue to drift until she finds herself with two, four, six or even seven million out of work. Whatever happens the effects of automation will be felt at every level of our society and to prevent it from being torn apart will require the commitment of expertise and resources on a scale probably not seen since the war. The big difference is that this problem certainly will not disappear after six years.

The National Cancer Institute and the fifty-year cover-up.

Peter Barry Chowka

"Think back over the years of cancer research, of the millions spent, the time consumed, the pains expended . . . and where are we today? Isn't it time to take stock of our basic concept to see if there isn't something radically wrong to account for the years of utter and complete failure to date? . . . Cancer has been consistently on the increase . . . Is it possible that the cause of cancer is our departure from natural foods?

Dr. William Howard Hay, Cancer Journal 1927

The government-funded cancer establishment — dubbed Cancer, Inc. by its critics — has diverted national research funds away from the encouraging leads that established a clear relationship between diet and cancer almost fifty years ago. By deflecting billions of dollars into treatments that are notoriously unsuccessful, but highly profitable to the medical establishment and by funding massive research that is mainly irrelevant because it focuses on symptomatic treatment rather than prevention, Cancer, Inc. has virtually covered up the real answer to prevention and cure of cancer, the return to a healthy diet.

Most of the recent news about the nation's cancer research efforts has been bad. In an exhaustive series of investigations a year ago *Newsday* concluded that the United States cancer programme is a 'complex bureaucracy floundering for lack of direction, and haunted by bungling political pressures and the potential for conflicts of interest at the highest scientific levels in government.'

The National Cancer Institute (NCI), part of the National Institutes of Health, has come to figure prominently in any discussion of cancer, the disease which, in this century, has become the worst plague in recorded history, a tragic metaphor for modern life in the industrialized west. Once a disease of old age, cancer now kills more children than any other illness; it is the second cause of death among adults, and the leading cause of death among women after the age of thirty-five. One in four of us will die from this scourge if current trends are allowed to continue. Some scientists predict a sharp increase in the cancer death rate within ten years, when the long term carcinogenic effects of chemicals recently released into the environment and the dietary change from simple whole foods to processed products begin to take their cumulative toll.

The immense growth of NCI has contributed to the recent trend towards centralization of health care within the sphere of the Federal government. Although it employs only 2,266 people, NCI's yearly budget of almost a billion dollars assures its dominance in the field of research. Independent cancer research without NCI support is very unlikely to get off the ground.

By the early nineteen seventies, with around 670 thousand people already employed in the U.S. on cancer research, the disease was becoming increasingly rampant. The government decided that the time had come to demonstrate their concern and a new 'war on cancer' was launched. The National Cancer Act was signed into law with much fanfare by former President Nixon and NCI's annual budget was increased from $230 million in 1971 to $815 million in 1977. Dr. James Watson, Nobel prize winner, who served on the National Cancer Advisory Board, said publicly in 1975, that the doubling of funds had merely doubled existing programmes, which were already having no impact. 'The easiest thing to do when you don't know what to do is to ask for more cash.' In a celebrated private assessment of the National Cancer Programme he commented, 'It's just a bunch of shit.'

Dr. Dean Burk, a founder of the NCI in 1937 and former chief of the department of cell chemistry at NCI until his retirement, agreed, when I interviewed him, with the negative assessments of NCI, noting that in medical administration the 'scum' rises to the top. 'You don't pay any bills for being dishonest in Science,' he added.

Asked about the kind of research conducted at the Institute in its early days Dr. Burk told me; 'There was not much emphasis on treatment then; it was more academic, with an attitude that the hospitals were the right place to handle treatment. In the nineteen forties one half of sponsored research on cancer concerned diet. 'We ''breathed'' diet then, even more than they ''breathe'' virus today.'

Dr. Burk then disappeared briefly into another office and emerged bearing two thick, dusty, yellowing volumes: the texts of scientific papers, presentations and discussions sponsored in 1944, '45 and '46 by the prestigious American Association for the Advancement of Science. Dr. Burk chaired the conference which brought together the most distinguished cancer researchers of the period. The first of his two volumes, dated 1944, contained forty pages on 'Diet' the second, 1947, had 116 pages on 'Nutritional factors.'

In 1944 Albert Tannenbaum, M.D. then director of the Department of Cancer Research, Michael Reese Hospital, Chicago, summarised for his colleagues the state of the art of cancer knowledge, as follows:

"In my opinion the NCI doesn't know how to carry out research nor how to recognise a new idea."

'The relationship of nutrition to cancer has received much attention in the past years . . . The exact relationship of nutrition to cancer, as well as to general body maintenance and growth, is as important to the investigators *not* concerned with nutrition as to those primarily interested in unearthing these relationships . . . *Diet and nutrition must be considered by all investigators in the cancer field, and not only by those who happen to be specifically interested in nutrition* . . . It is now known that the fat content of the diet affects tumour formation in the mouse. The incidence of spontaneous breast tumours is significantly increased and the time of appearance decreased, by a high fat diet; the incidence of induced skin tumours is also definitely increased . . . adequacy of protein, amino acides, vitamins and minerals is also important . . . The qualitative inadequacy of a diet may be mirrored in effects upon tumour production.'

The striking results of Tannenbaum's own experiments limiting the intake of calories, fat and excessive protein in laboratory mice, suggest an important link between the modern plague of cancer and the artificial diet widely eaten by the people of affluent nations. For additional corroboration Tannenbaum cites a number of early epidemiologic studies conducted between 1913 and 1939, all of which conclude that 'cancer mortality increases with excess bodily weight.' The extensive references quoted at the end of Tannenbaum's paper illustrate the extent of the interest in diet and cancer during the thirties and forties.

When I asked Dr. Burk what had happened between the middle forties and today to explain the twenty-five year gap in pursuing these dietary findings, he replied, 'After World War II along came chemotherapy, and in the early fifties the virus programme diverted attention away from diet.' Asked whether this had a connection with vested interests currently dominating medical research he agreed that 'There is a lot of truth in seeing an economic basis in preferring treatments over prevention.'

Originally offshoots of research on poison gases during World War II chemotherapy drugs are profitable byproducts of the petrochemical industry. NCI spends $75 million annually in testing some thirty thousand chemicals for possible use as drugs against cancer. Fewer than five are eventually approved each year. Dr. Guy Newell, acting director of NCI during 1977 said: 'We cast our nets throughout the world to look at all kinds of compounds including those that were produced for various reasons by the chemical companies. It was a random approach.'

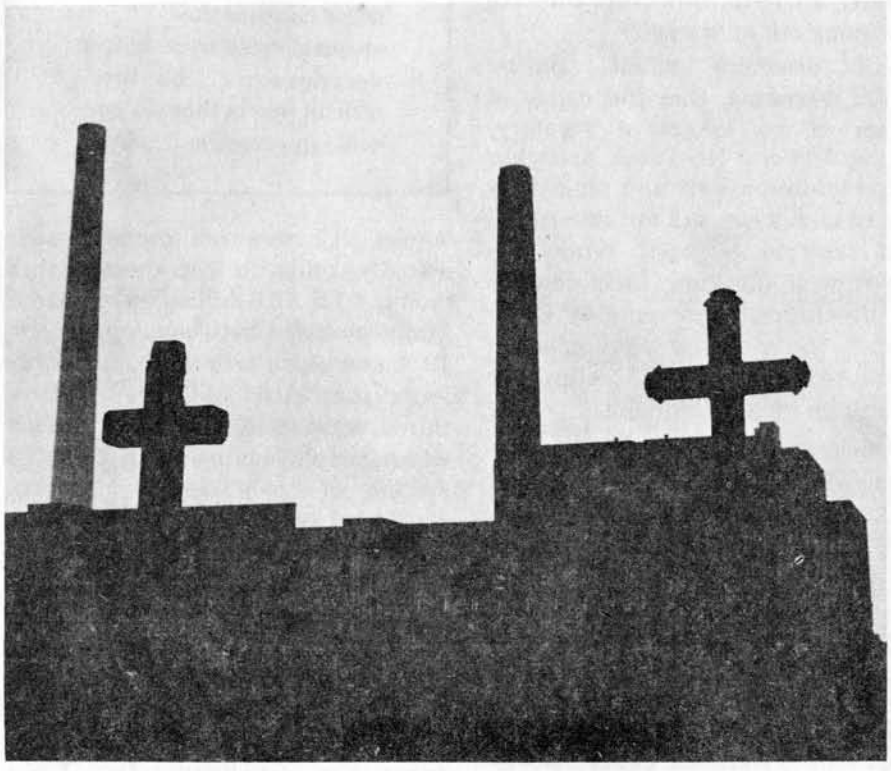


Photo: B.S. Mitchell

Cancer — the worst plague in recorded history.

Draining interest and money away from dietary studies, the virus programme continues to siphon off $102 million of NCI's annual budget. Between 1965 and 1977 the virus programme received $766 million of Federal tax money. A recent comment by Irwin Bross Ph. D., director of biostatistics, Roswell Park Memorial Institute, is representative of many recent re-evaluations of this investment: '*Viral research is a waste of time. Virus is getting a huge chunk of funds and it's all going down the drain.*'

An Advisory Board sub-committee of the NCI chaired by Dr. Norman Zindler following a year long investigation in 1973/4 came to a similar conclusion: 'a viral etiology for most human cancers is an unlikely eventuality . . . the virus programme seems to have become an end in itself, its existence justifying its further existence . . . We seem to have the peculiar situation of Cancer Institute staff scientists writing contracts for private industry, from which comes money to support their own work.'

Dr. Guy Newell admitted to a Congressional committee investigating his agency during 1977 that the $766 million NCI virus programme had developed only 'negative information' during its long existence. Put bluntly this means it had shown *no link* between virus and human cancer.

'The American public is being sold a bill of goods about cancer . . . Today the press releases coming out of NCI have all the honesty of the Pentagon's,' commented Dr. James Watson, reminding us all of the futility that has characterized the cancer war as strongly as the Vietnam War which it replaced.

In 1978, as the U.S. enters the seventh year of its war on cancer, the veneer of progress is beginning to wear thin. Critics, increasing in numbers, are pounding away; NCI administrators are often forced to face hostile Congressional inquiries into their actions; with a few exceptions the effort reeks of waste, mismanagement and opportunism. Of the total funds appropriated to NCI over the past forty years, 62.2 per cent have been spent in the last five

alone.

'The patterns of research support reflect the interest of the scientist much more than the state of the cancer problem,' Dr. Barry Commoner has said, and to excuse such a state of affairs Dr. Michael Shimkin of NCI explained 'When the Air Force is trying to sell bombers it uses every trick of the advertising trade. Well, alright, we have to do that too. Of course it's inevitable when you go to the public for money.' In 1978, however, the NCI is running out of 'tricks'.

NCI directors admit, during candid moments, that the cause of cancer is no longer a mystery. Former Director Dr. Frank Rauscher stated 'between sixty and ninety per cent of man's cancers are associated with external factors.' While Dr. Guy Newell admitted 'Most cancers are theoretically preventable if we identify the causative agents, avoid exposure to them, [and] eliminate them from the environment.'

Speaking at MIT in 1975, Dr. James Watson concluded, 'It makes most sense rather than striving for early detection, to spend most of this (NCI) money to see that known environmental carcinogens are kept away from the American public. But such a goal will bring the NCI into direct conflict with the very powerful industrial lobbies, and, at least when I was on the National Cancer Advisory Board (1972-74), there was a noted reluctance for the NCI to take on any regulatory role.'

One of the responsibilities of the NCI is to test chemicals present in the environment to determine if they cause cancer; federal regulatory agencies, including the Environmental Protection Agency and the Food and Drug Administration rely on these NCI tests in deciding whether to ban or restrict exposure to a chemical. Of the many thousands of artificial substances present in food, air, water and the workplace, only 200 had been tested by mid-1976. At that time the associate director of the testing programme, Dr. Umberto Safiotti, resigned, charging that the financial starvation of his programme had crippled its capacity and independence and even prevented test results already completed from being issued. By January 1977, in fact, reports on only six of the two hundred chemicals had been made public. Safiotti decried 'a situation which in fact deprives the regulatory agencies, industry, labour, consumers and the scientific community of data of urgent public health value.'

Newsday's study, published in 1977, revealed serious conflicts of interest at NCI. 'The same scientific "establishment" which determines

> **"I'm convinced that for some cancers the survival rates were better decades ago . . . but the official line is that we're making progress"**

where NCI research money goes, actually winds up with most of that money.' Of $1.6 billion in research grants awarded between January 1st 1971 and April 28th 1975, *Newsday* found that $1.06 billion — or two-thirds, went to firms and institutions whose employees serve in the NCI system of 'peer review' groups, consisting of outside scientists who are paid by NCI to review research contract proposals!

The basis of the review system — its members drawn largely from the ranks of treatment (surgery, radiation, chemotherapy) or narrow research disciplines (virology) — is everywhere apparent. Dr. Linus Pauling, in a letter dated May 10th 1977 to the House Committee on Government Operations states *'In my opinion the NCI does not know*

> **"Giving no treatment proved a significantly better policy for patients' survival and quality of remaining life"**

how to carry out research nor how to recognise a new idea.' Bearing out this reflection Dan Greenberg writing in the *Columbia Journalism Review* describes how Dr. James R. Enstrom of UCLA's School of Public Health discovered a low cancer death rate among Mormons, whose religion forbids alcohol and tobacco and encourages dietary moderation. Dr. Enstrom sought support from NCI to further explore his finding, but was turned down. An NCI administrator commented 'He is probably on to something pretty interesting, but it's really a bit too unconventional to expect this place to be interested in it.'

Meanwhile the cancer death rates continue to rise and the treatments are expensive failures. This depressing scenario is inevitable so long as those responsible for the policy of NCI continue to ignore advice such as that offered by Dr. L. Duncan Bulkley, senior surgeon at New York Skin and Cancer Hospital, almost half a century ago: *'The avoidance of the dietetic and other causes which have been found to induce cancer in nations and individuals, promises the best hope for the arrest of the rapidly increasing development of cancer throughout the world.'*

Although its exaggerated claims of progress have been toned down slightly of late, NCI still claims 'the outlook for cancer patients constantly improves.' More truthful, however, is this conclusion by a physician who occupies a top administrative post at one of America's most eminent cancer institutions as quoted by Greenberg in the same article in *Columbia Journalism Review:* 'I'm convinced that, for some cancers the survival rates were better decades ago, but don't tell anyone I said that. The official line is that we're making a lot of progress.' Largely because of Greenberg's efforts to untangle and demystify NCI's own statistics on cancer survival the words 'improved slightly' and 'gradually' have replaced the earlier unqualified claims of success. (The American Cancer Society, however, which also uses NCI figures, still insists 'Cancer is one of the most curable diseases.')

The latest *Cancer Patient Survival Report* No. 5, issued in late 1977 by NCI, admits 'The five year relative survival rate for all types of cancer combined, increased slightly from thirty-nine per cent for 1950-59 to forty-one per cent for 1967-73.' Dr. James Enstrom cautions that these statistics are heavily biased to begin with because only the best hospitals with better ancillary care are allowed to contribute data. Enstrom says it is not unusual to find twice as many patients dying of

cancer in the poorer hospitals, but their statistics are not represented in the NCI sample. The NCI data, in fact, are based on figures from only one hundred of the nation's seven thousand hospitals, or about 1.3 per cent.

Evidence is now accumulating which suggests that total avoidance of all medical therapy prolongs the patient's life. In 1975, researchers at Oxford University did a study of no treatment versus single-agent chemotherapy versus multiple chemotherapy; in an article published in the *Lancet* they reported their conclusion that *'no treatment* proved a significantly better policy for patients' survival and for quality of remaining life.'

Until a century ago physicians the world over were linking diet to disease, often treating patients with their nutritional needs and metabolic wholeness in mind. More recently, however, a widespread misunderstanding has become dominant, as our modern, 'scientific' technocracy began to teach that diet is not worth serious consideration in the genesis or treatment of disease. At present, anyone who questions that view is liable to be branded a 'quack' or worse and is punished by professional ostracism or even criminal prosecution.

Dr. Gio B. Gori believes that the best hope for the prevention and control of Cancer... ...lies in Nutrition.

A recent government pamphlet *Cancer* insists 'useless treatments by diet . . . offered by quacks, seriously endanger the lives of cancer patients.' In the light of the uselessness of medical therapy this quote might be amended to read ' . . . treatment by diets seriously endangers the vested interests of the NCI and our medical technocracy.'

Fortunately, if somewhat surprisingly, a constructive, though underfunded research effort, linking diet and cancer is now alive and well again in the heart of the research establishment. Representing less than one-half of one per cent of the Federal government's billion-dollar a year cancer war, the Diet and Nutrition Programme is now pursuing promising work on the link between diet and cancer, which was dropped back in the nineteen forties. The research is presided over by Italian born Dr. Gio B. Gori who said recently *'The best promise for the prevention and control of cancer and other illnesses and for securing and maintaining human health lies in nutrition.'* He believes that the NCI and the American Cancer Society are genuinely interested in this field, but he knows that he must tread warily, for the least unpopular move on his part could threaten the very existence of his nutrition programme which is completely at the mercy of the vested interests represented by NCI.

Radioactive waste disposal is the Achilles Heel of the nuclear industry

Wasting Away

By Lorna Salzman

For decades the nuclear industry has been seeking a safe method of radioactive waste disposal. As yet their search has been a dismal failure. The longer the problem remains unsolved, the less credible are assurances that an acceptable solution will eventually be found.

If any issue has the power to shut down the nuclear industry, it is the disposal of radioactive wastes. To the general public it poses a more insidious and intractable threat than any other aspect of the nuclear fuel cycle. Hostility to dumping plans continues to mount, and is hitting the industry where it hurts.

In August, the Brookhaven National Laboratory, Long Island, announced that unless bans on the transport of nuclear waste through New York City and New London were lifted, it would be forced to shut down. Unable to ship the spent fuel elements from its experimental High Flux Beam reactor for reprocessing in South Carolina, the laboratory now finds its existing storage facilities dangerously close to overflowing. Brookhaven's problems reflect the extent to which the waste disposal issue has become the Achilles heel of the nuclear power programme. Earlier this year, for example, the California State Legislature vetoed plans for the $3 billion Sundesert nuclear power plant after the San Diego Gas and Electric Company had failed to convince them that adequate waste disposal facilities were available. That veto resulted in a nuclear moratorium in California — a lead that has since been followed by several other states. Indeed the depth of public hostility over the waste issue was revealed by a Harris Poll published last Spring: whilst residents in New York State opposed the siting of a reactor near their homes by two to one, they opposed the storage of radioactive waste *anywhere* in the state by an overwhelming four to one.

In the face of such widespread opposition, the nuclear industry's survival clearly depends on convincing the public that it can not only contain but also *isolate* the wastes indefinitely. That distinction is important, for whilst it is easy to propose methods of waste solidification, encapsulation and geological burial, it is difficult, if not impossible, to demonstrate effective long-term isolation. Yet failure to do so could well bring a national moratorium on the development of nuclear power. The industry's past record of waste management hardly inspires confidence. Almost without exception, the storage of wastes has been marked by clumsy handling, incompetent inspection procedures and shoddy containment practices. Staggeringly large amounts of high and low level wastes — in addition to plutonium — have already been leaked (sometimes intentionally) into the soil and water, resulting in irreversible damage to both public health and the environment.

What then is the extent of the USA's waste problem? And how likely is it to be solved?

Uranium mill tailings

Milling operations crush the uranium ore, separating the uranium-238 and its small uranium-235 component from the rest of the ore and leaving posterity to deal with vast quantities of finely powdered tailings that emit the same dangerous radio-isotopes as uranium itself: thorium-230 and radon-226. The latter decays to gaseous radon-222 whose radon daughters are alpha emitters which cause lung cancer if inhaled. Since the thorium-230 that gives rise to the radon has a half-life of 80,000 years (and itself arises from uranium 238 with a half-life of 4.5 billion years) these tailings will continue to give our descendents doses of alpha radiation for countless generations.

From 1948 to 1968, when uranium was mined for military and commercial purposes, about six thousand miners in the US were 'significantly and needlessly exposed to radioactive gases present in the air of uranium mines' (Rand Corporation). Several hundred have since died of lung cancer and the US Public Health Services estimate that a further eleven hundred deaths can be expected. In Canada dust levels in uranium mines near Ontario were

consistently above the industry's safety guidelines over a period of fifteen years; nothing was done to curtail them. Over 100 million tons of mill tailings are presently stored in huge piles above ground in the Western States and some have leached into rivers used for drinking water or have simply blown away. Incredible as it now seems there were many cases when they were simply given away; builders used them in foundations for schools, homes, roads and public buildings, until in the 1970s, it was discovered that the inhabitants of these buildings were receiving the equivalent of up to 500 chest X-rays each year from the radon gas seeping up through the floor. Many foundations were dug up and carted away, but by then much damage had been done. As for the US Government, it totally ignored the health hazards of radon in its reactor licensing procedures until Robert Pohl, a Cornell University physicist, forced it to admit that they had been underestimated by a factor of 100,000.

The solution to the tailings problem is well-known: burial to a depth of 100 feet (roughly the depth of the original body of ore) so that radon gas, with a half-life of 3.8 days, can decay before reaching the surface. Since this would drastically increase the costs of commercial nuclear power, the central government plans instead to turn all tailings over to the States legislature and is trying to enact laws absolving itself from all damage to health caused by tailings, including those already accumulated.

High-level wastes

High-level wastes, mainly consisting of spent fuel elements and acid wastes (in some cases neutralized) left over from reprocessing, emit intense radiation that requires heavy shielding. The waste elements of greatest concern are the fission products, chiefly strontium-90, cesium-137, iodine-129 and technetium-99. Iodine-129 has a half-life of 10 million years; strontium-90 of 38 years; cesium-137 of 30 years; and technetium-99 of 200,000 years.

At present the volume of high-level wastes from commercial reactors is only a fraction of that previously generated by the military, largely through their plutonium production programme at Hanford, Washington. (It is estimated that by the 1980s the military alone will have produced nearly half a million tons of high-level wastes measured in solid form). Yet in terms of the radiation hazard they represent, commercial wastes are far the more dangerous: per unit of volume, fission products from the commercial programme are one hundred times greater in radiotoxicity than those produced by the military programme. At the end of 1977, the inventory of curies of important nuclides generated from military and commercial operations was about equal, by 1985, the total inventory of fission products in high-level wastes *alone* is expected to be 100 million curies, mostly derived from the commercial programme. One microcurie is considered the maximum permissible body dose.

The Hanford tanks, with about 71 million gallons of neutralised high-level liquid wastes (some salt cake or sludge form) have a dismal history. Over the thirty years of military activities, 450,000 gallons of high-level waste have leaked into the soil and in some areas into the ground water beneath the reservation which adjoins the Columbia River. The leaks were largely due to the tanks being corroded by acid wastes, as well as criminally lax inspection and monitoring techniques. The largest single leak — 115,000 gallons — contained nearly 270,000 curies of ruthenium-106, 40,000 curies of cesium-137, 4 curies of plutonium-239, 0.6 curies of americium-241 and 13,000 curies of strontium-90. Tritium and ruthenium have both been detected in the water table; strontium-90 and iodine-131 were found in the Columbia River itself; and large amounts of plutonium, stored in outside trenches, have had to be dug up and dispersed because the Government feared a spontaneous explosion. Plutonium-239 also percolated into the covered cribs outside and recent studies indicate that the concentration of plutonium in the sediment beneath the cribs is as high as 0.5 microcuries per gramme — five thousand times the maximum permissible concentration in the soil. After the leaks, the wastes were neutralised but this produced a fission product slurry on the bottom of the tank which no-one knows how to remove. The high-level wastes in the Hanford tanks contain up to 10,000 curies of radioactivity per gallon.

New York has banned the transport of spent fuel through its streets. Other cities have followed suit.

Low-level wastes

Low-level wastes can either be liquid or solid, and include clothing, filters, tools and other material contaminated with plutonium and other transuranics. They have been buried in six shallow burial grounds dotted across the United States. At the Nuclear Fuel Services site at West Valley, New York, radioactive material leached into the nearby creeks that feed Lake Erie after some of the burial trenches were flooded with water; later a study undertaken by the Wood's Hole Biological Laboratory revealed that traces of curium-244 had been found in both Lake Erie and Lake Ontario. At Hanford, low-level wastes are *deliberately* percolated into the soil. At Maxey Flats, Kentucky, plutonium from burial trenches was found to have migrated in the soil to a distance of two miles within a few years of dumping, confounding the experts who claimed that absorption by soil particles would prevent such movement. A recent study in *Science* (June 30th, 1978) reports that trace quantities of certain radionuclides (primarily cobalt-60, but also isotopes of plutonium, thorium and cesium) are migrating from both solid and liquid waste disposal pits at Oak Ridge National Laboratory (ORNL), Tennessee — despite the predominant bedrock of the burial ground being Conasauga shale, which is supposed to have an ext-

remely high absorbtion capacity for most fission products. The cobalt-60 had been transported into the groundwater from the burial trenches in an organic form. The researchers, James Duguid of Battelle-Columbus Laboratory and Jeffrey Means and David Crerar from Princeton University, pointed out that organic chelates used in decontamination operations (not only at ORNL but at nuclear establishments throughout the world), in combination with natural organic acids in the soil, reduce the capacity of the soil to absorb radionuclides. Still worse, chelates increase the uptake of numerous trace elements by plants, and thus increases the possibility of certain radionuclides — notably plutonium-239 and americium-241 — entering the human food chain.

In addition, there have been innumerable losses of low-level wastes through transportation accidents. Last Spring, for example, 40,000 pounds of yellow cake (uranium oxide) were spilt when a truck carrying it in metal drums collided with three horses on a deserted Colorado road, and overturned, rupturing the containers and spewing the contents a foot deep across the road.

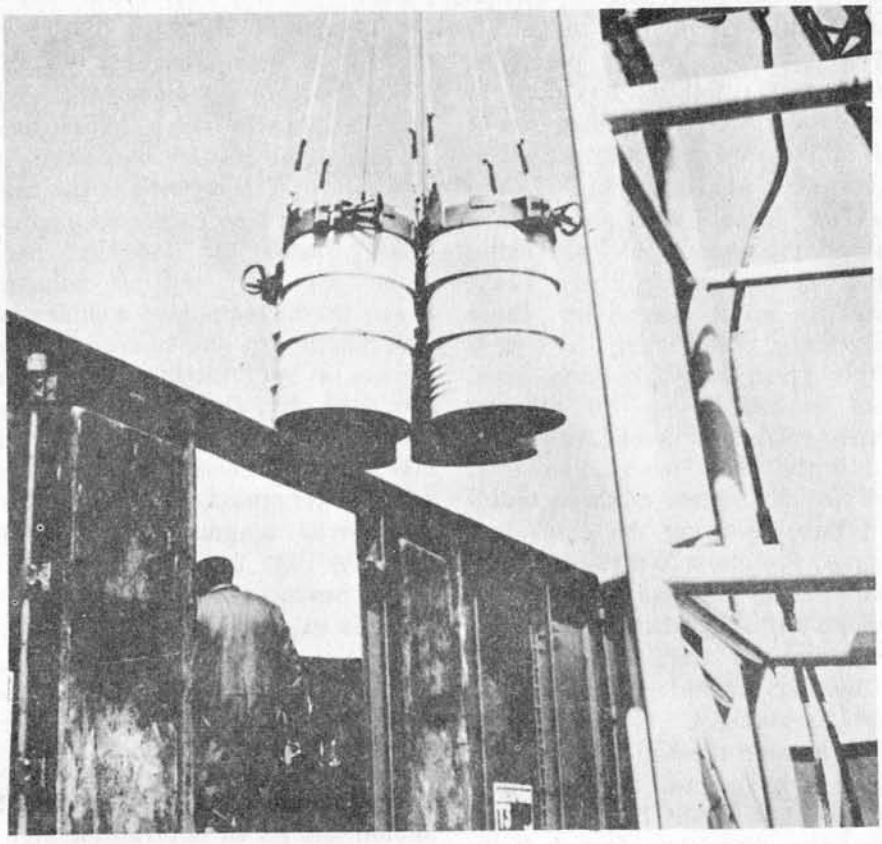


Photo: Nuclear Engineering International

Accidents during the transport of wastes are numerous.

Aged reactors

What does one do with a nuclear power station that has reached the end of its useful life? What is the best way to get rid of the fifteen to twenty per cent of its contents that is still highly radioactive. As yet no-one knows the ultimate technical, financial and health costs of complete reactor decommissioning. So far the twenty reactors that have been closed down in the Western world have all been prototypes which have only been in operation for relatively short periods. Their radioactivity levels are only a fraction of the levels forecast for the large commercial reactors due to be closed down in the next twenty years. Even so, when a small research reactor was recently dismantled (under water to minimise radiation exposure) the cost of the operation was about equal to the cost of its construction.

'Dismantling a commercial plant may cost anywhere from $31 million to more than $100 million in 1977 dollars — between three and ten per cent of the $1 billion capital cost,' predicts a recent U.S. Congress report, *Nuclear Power Costs*. Those figures do not include the perpetual care costs for tending the rubble from the plant which contains radioactive nickle that may remain hazardous for up to 1.5 million years.

Reactors are dismantled in three stages: mothballing, entombment and complete removal — a process that for a large reactor may take anything from fifty to a hundred years. Only five prototype plants have gone beyond the mothballing stage, at which the plant is kept intact but the reactor is sealed off with anti-contamination barriers. In the second and third stage, reports *The Economist* (May 6th 1978) 'workers will need to remove from a typical magnox reactor radioactive parts consisting of 2,500 tonnes of mild steel, 100 tonnes of stainless steel, and 2,500 tonnes of graphite, The inner layer of the concrete shield around the plant will also be radioactive to a depth of 1.5 metres. All this must be dismantled, shipped and stored.' It may well be that the US Government merely intends to 'mothball' all reactors. If so the American landscape will some day be dotted with monuments, even entire zones, requiring perpetual surveillance.

Although an EEC committee is looking into the problem, nobody yet knows how a reactor will be dismantled in the case of an emergency.

The disposal dilemma

For the ordinary citizen, caught up in the waste disposal controversy, separating myth from reality is extremely difficult. The Government persists in asserting that a solution is in hand and simply needs some hard decisions and hard money to be implemented. Yet one need only refer to some of the Government's own studies to realise that what exists are not demonstrated technologies but merely *concepts* of waste handling, containment and burial. In fact the more research that is done into methods of waste disposal, the more scientists are realising the extent of the gaps in their knowledge. A recent report, prepared by the Office of Science and Technology Policy, admits that 'the knowledge and technological base available today is not yet sufficient to permit complete confidence in the safety of any particular repository design or the suitability of any particular site.'

No commercial waste has yet been solidified in the US and although some fission products have been vitrified into glass blocks in France, it has since been revealed that they have already begun to leach. Not surprisingly vitrification has come under attack; 'In the opinion of the materials community, glass is relatively unstable and thermodynamically bad — in short it "chews up" easily', says Rustum Roy, Director of the US National Academy of Science's Committee on Radioactive Waste Management, whose highly critical report was published in August.

As yet no satisfactory terminal geological repository has been located. Indeed the deadline set by the Government for deep-earth isolation has already been postponed until the early 1990s, and many believe that it will be further postponed until the beginning of the next century. The Government's main disposal strategy at present is a rather pathetic plan to construct two Away-From-Reactor (AFR) sites — effectively oversize ponds in which spent fuel elements can be temporarily stored. Without these AFRs the Nation's reactors, already rapidly exhausting their own fuel ponds, will soon have to shut down.

In fact, the AFR policy is merely a return to an earlier, discredited concept of waste disposal known as Retrievable Surface Storage (RSS) which was intended to keep spent fuel within easy reach for eventual reprocessing. At the time the RSS method was severely criticised by many Federal Agencies which feared that it could well become a permanent solution. Those fears are now confirmed; with permanent burial a distant chimera, the RSS, in the guise of AFRs, will be the sole means of waste disposal for the forseeable future — a series of high-level waste repositories above ground, but without the multiple barriers of geological sites to contain the radioactivity. Not surprisingly critics of nuclear power see the decision to opt for AFRs as an admission that a permanent solution is remote. Or is it a cynical and none too subtle move not to solve or even ease, the waste problem, but to prop up a failing industry?

In a desperate attempt to calm public fears by digging a hole in the ground and getting some waste in there fast to demonstrate a 'solution', a plan for a terminal repository — the Waste Isolation Pilot Project (WIPP) — is being pushed through in New Mexico. At first the State (whose largest employers are the Los Alamos weapons laboratory and the Sandia Laboratory) welcomed the project but withdrew their support when they discovered that they would receive not only low- and high-level military wastes but high-level commercial wastes and 1000 spent fuel assemblies as well. Even formerly enthusiastic officials are now balking at the idea, and one of them has introduced legislation in Congress designed to give states the right of veto over waste repositories. Many other Senators would also like to give their states guaranteed right of veto on which the Government could never renege. But whilst the DOE claims that it will honour any state refusal to accept waste, it clearly could not tolerate such refusals from all fifty states. Understandably, Secretary of Energy James Schlesinger is not keen to give the states a statutory right of veto: 'I think the matter would be best left unresolved,' he told a House Committee on Internal Affairs. 'It is a grey area of the law and I think that it is more convenient to leave it there rather than trying to define it too precisely.'

Salt deposits

Most of the Government's efforts at deep-earth burial have gone into the exploration of salt formations, primarily in New Mexico, Louisiana, New York, Ohio and Michigan. Salt was generally viewed as the most promising of all geological media, mainly because of its plasticity which, it was believed, could help seal the repository. As recently as 1976, officials from the Energy Research and Development Administration (ERDA — now the Department of Energy) were predicting confidently that burial in salt would require 'only straightforward technological and engineering development'. Now, however, salt is seen to have major drawbacks, all of which have been minimised by the industry: it is highly corrosive, not entirely free of water as had been assumed, and is usually located in areas of oil, gas and potash which could mean that there are uncharted drilling holes that would weaken the integrity of the salt formation. (Precisely that happened at Lyons, Kansas, where the Oak Ridge National Laboratory was storing spent fuel in 1965. In 1970, the government announced that Lyons would be the first Federal waste

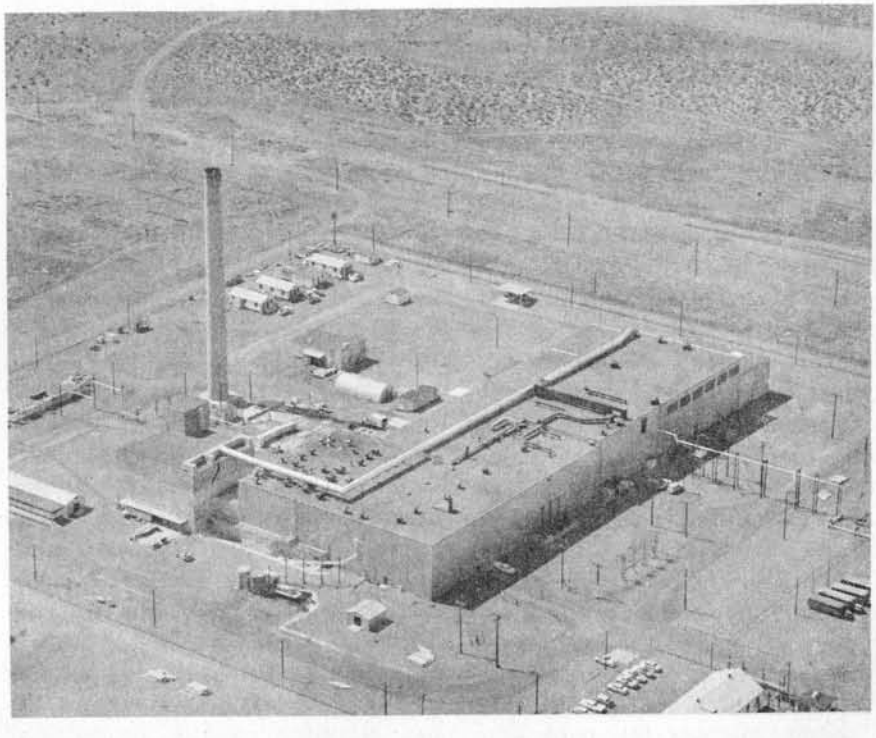


Photo: Nuclear Engineering International

Hanford Reprocessing Plant: low level wastes are leaked intentionally into the soil

repository, but over the next few years old oil and gas holes were discovered near the site and the plan was abandoned).

The use of salt deposits has come in for strong criticism from both the Office of Science and Technology Policy (OSTP) and the U.S. Geological survey (USGS). The OSTP report that whilst salt is the best understood of all geological media, and 'with conservative engineering' might be an acceptable repository, it has unique problems: 'Because of salt's highly corrosive nature, currently planned waste containers would seem to be breached and substantially corroded by all but the very driest salt within months to years.' They add that salt is soluble and 'does not provide the absorptive qualities of other rocks nor is it benign to interactions with the waste and container'. These, it states, could prove 'troublesome' in the event of a canister breaking. The OSTP also stresses the great gaps in technical knowledge of waste disposal.

The same point is taken up in the USGS's recent circular on geological disposal; 'Many of the interactions (between waste, canister and geological medium) are not well understood, and this lack of understanding contributes considerable uncertainty to evaluations of the risks of geological disposal of high-level waste.' The circular also pinpoints three major problems that are likely to occur in salt formations: disturbance of the medium caused by the actual mining; chemical disturbances created by introducing new fluids not in chemical equilibrium with the salt; thermal disturbances from hot wastes that will in turn compound the two other problems. It also expresses concern for unknown geological faults, ground water conduits and abandoned excavations — all of which could allow water into the repository. In addition, hot canisters tend to attract brine towards them.

Salt was not the only geological medium the USGS was worried about; in rock deposits chemical changes due to the introduced thermal energy, could lead to thermal expansion and contraction that would fracture the canisters. This thermal energy could also break down hydrated minerals and form new ones, with significant increases in the permeability of the rock. 'Given the current state of our knowledge,' warns the USGS, 'the uncertainties associated with hot wastes that interact chemically and mechanically with the rock and fluid system appear very high.'

In June a brutally honest report from the US Environmental Protection Agency gave what may be the death blow to the use of salt for disposal. This report explodes the common belief that many salts do not contain water; close inspection of even the dryest salts reveals 'significant amounts of water in fluid inclusions and intergranular boundaries.' The waste canisters are 'likely to be bathed in water soon after emplacement' and, worse still, the moisture will actually cause the crystals to burst at temperatures half that of the canister. As for the canister itself, the report states that 'no tests . . . have shown that any of the candidate metals will resist corrosion by the salt solutions that are likely to be at the canister surface for a significantly long time. Under these circumstances it is likely that the canister could be breached *within time scales of a decade or less.*'

Conclusion

Neither the Government nor the nuclear industry will countenance discussion of a nuclear moratorium until waste isolation technology has been desmonstrated, nor will they admit that continued production of wastes could conceivably make the situation worse. They respond that even if the industry shuts down, we will still have large amounts of waste to deal with. This is an argument which totally misses the point: not only is it easier to deal with a fixed quantity of wastes than with a quantity ten times as large: but also there may be very few — perhaps only one — geologically acceptable burial site in the US. Only a limited amount of waste could then be accommodated, and continued production will require additional burial sites that may be totally unsatisfactory.

The key questions are: how much is the problem compounded by *not* stopping waste production? How many tons of uranium tailings will blow in the wind? How many more thousands of annual truck and rail shipments of uranium and spent fuel will be needed? How many more derailment accidents will there be? How many additional AFRs must be built? And how many permanent burial sites?

If after twenty years of nuclear power no single example of effective containment has been demonstrated, what hope is there of future success? Can there possibly be any justification for allowing the nuclear industry to go on manufacturing waste products whose potential for destruction neither scientists nor government can begin to calculate? Can it be permitted to prop itself up with the myth rather than the reality of safe waste disposal?

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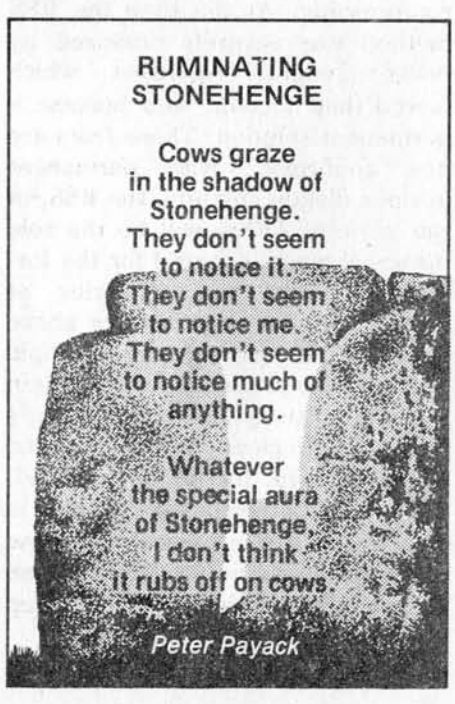
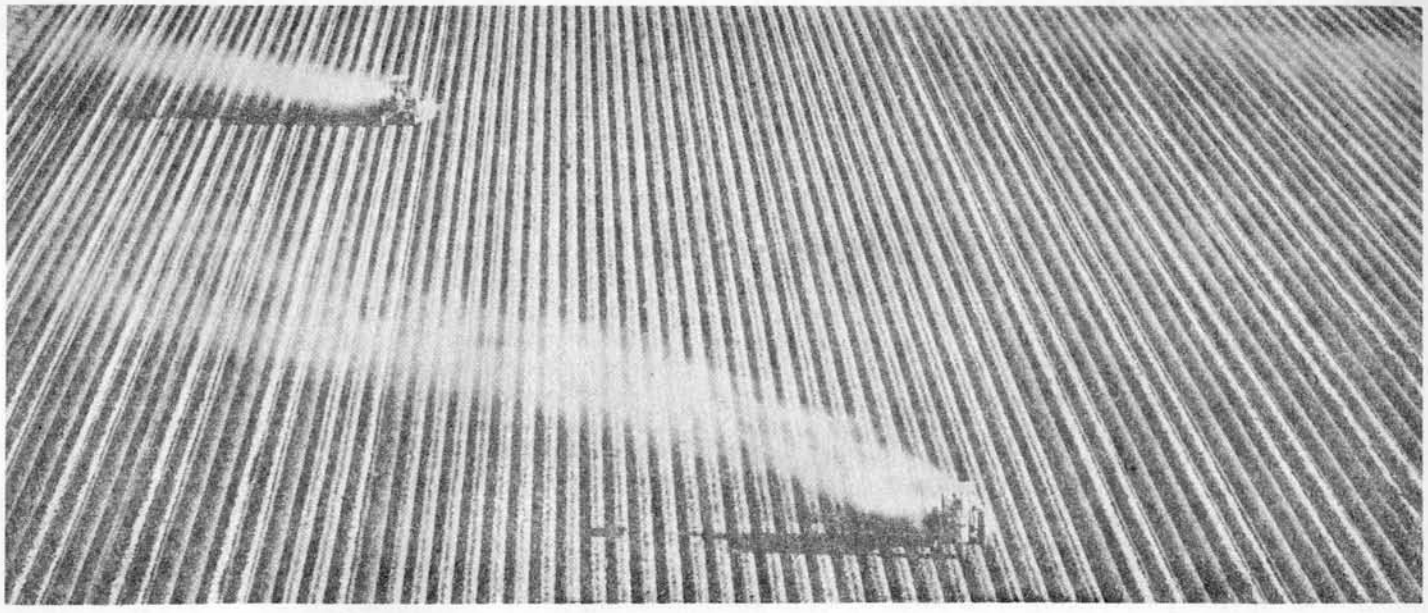




The Corporate Invasion

Peter Barnes

The US Department of Agriculture and the tax laws together support the takeover of vast tracts of farmland by giant business conglomerates. In every respect the dice are loaded against the small family farmers who are forced to sell out or go bankrupt. In this article the author calls for a new 'Homestead Act' to reverse what he sees as a headlong gallop to ultimate destruction of the land.

Despite the congestion and decay and pollution in most American cities, people are still leaving the land and flocking to urban areas in droves. This is not because they want to leave the land but because they are forced to. Every week about two thousand family farms go out of business. Usually these are farms that have been owned by oldtimers who've been trying to scratch out a living for years, are heavily in debt, and finally throw in the towel. Thousands of farmworkers and sharecroppers also leave the land each year because they've been replaced by machines developed by the big agricultural universities. Everybody complains when a big company like Lockheed is forced to lay off workers, but nobody gets excited when farmers or farmworkers lose their jobs. That's progress, the experts say. It's also slums, rising welfare rolls, and a lot of human misery.

The most disturbing thing happening in rural areas is a steady take-over by giant corporations. In some parts of the country, particularly the West and the South, this has been going on for some time. These areas have long been characterized by large landholdings — the big plantations in the South, the enormous ranches of the West. In recent years, these large landholdings have come under increasing control of corporations based in New York, San Francisco, Houston and other cities.

It's very difficult for even the most efficient family farmer to compete against a giant conglomerate such as Tenneco, a multi-billion dollar enterprise that's near the top of *Fortune's* list of American corporations. Tenneco not only owns or leases more than a million acres of land in the West, it also sells oil and natural gas, makes farm machinery and fertilizers, builds ships for the Defense Department, packs and distributes its own food, and spends millions to advertise its brand name. Tenneco executives say they want to build a totally integrated food system that is Tenneco-owned 'from seedling to supermarket' — and they're well on their way to achieving it.

Other giant corporations are playing the same game. Among the blue-chips that have lately plunged into agriculture (often as a way-station on the road to land development) are Dow Chemical, Monsanto, Union Carbide, Kaiser Aluminum, Aetna Life, American Cyanamid, Goodyear, W.R. Grace, Getty Oil, Purex and Coca-Cola. You'll notice that a lot of these are oil and chemical companies. Along with a few dozen timber, coal and railroad companies, these big conglomerates are now the effective rulers of rural America.

What are the consequences of the corporate invasion of agriculture? For one thing, small-town businesses are dying because city-based corporations don't make their purchases locally. In addition, farmers — if they're not forced off the land — quickly lose their independence. They become mere cogs in a corporate-dominated food production system. For example, Harrison Wellford, an associate of Ralph Nader, has described in a recent book (*Sowing the Wind*) how once-independent poultry farmers have become virtual peons of Ralson-Purina and other agribusiness corporations. In some cases their expenses actually exceed what the corporations pay them, so they wind up working for *minus* 30 cents an hour or even less!

The same sort of thing has been happening in the cattle industry. As Victor Ray of the National Farmers Union has pointed out, cattle feeding in Colorado has

been taken away from family farmers and is now a corporate operation, controlled by packers. What it all boils down to is this: the same corporations that produce chemicals and put additives in our food are now squeezing out the small independent farmer. The corporations claim that this will benefit the consumer, but I haven't noticed supermarket prices getting any lower, or the quality of food getting any higher.

There's another consequence of big-scale corporate farming — the loss of rural citizens of control over their own communities. I remember driving through the town of Mendora, California, not long ago and talking with Jack Molsbergen, a local realtor. Molsbergen told me how the people of Mendota had wanted to construct a local hospital, since the nearest one is forty miles away. But three giant corporations that own more than half the land around Mendora opposed the hospital plan and killed it. 'Why would a corporate executive who lives in Houston give a hoot about a hospital in Mendora?' Molsbergen asked.

Another alarming development in rural America is the slow but steady deterioration of the environment — the spread of plastic, suburban-type developments over what was once prime cropland, and the poisoning of the soil through excessive use of inorganic chemicals. Family farmers, of course, are frequent abusers of fertilizers and pesticides, but the biggest offenders are giant corporations — spray now and pay later seems to be their motto. The corporations are also most actively engaged in land speculation and development, activities which drive up the price of land and make it even harder for new farmers to get started, and for old farmers to pay their taxes.

Perhaps some corporate executives do care about what they are doing to the land, but I doubt that many do, or that they can really love the land the way a farmer does who lives and works on it every day. I suspect that most corporate executives would agree with Simon Askin, a vice-president of Tenneco, who was quoted in the Los Angeles *Times* as saying, 'We consider land as an inventory, but we're all for growing things on it while we wait for price appreciation or development. Agriculture pays the taxes plus a little.'

The worst part about what's happening to farms and to rural areas in America is that none of it is accidental. The exodus of people from the land to the cities, the domination of rural communities by absentee corporations, the subdivision of good cropland and the massive use of inorganic chemicals — all these things are considered *desirable* by the U.S. Department of Agriculture and are promoted by a wide variety of government policies.

For anyone who wants a good understanding of where the U.S. government thinks we ought to be heading, I strongly suggest reading the February, 1970 issue of *National Geographic*. Here are stunning photographs of an egg factory near Los Angeles where two million caged Leghorns gobble 250 tons of feed and lay one million eggs each day; a cattle metropolis in Colorado where 100,000 steers fatten on formulas prescribed by computer; a 23,000 dollar tomato harvesting machine, developed by the University of California, that snaps up hard-skinned tomatoes especially bred for mechanical picking and packing.

The most frightening picture in the *National Geographic* article is an artist's depiction, under USDA guidance, of a typical American farm of the future. The farm — if that is what it can be called — is more than ten miles long and several miles wide. Obviously, only a giant corporation could own it. All operations are monitored from a bubbletop control tower by one man. An enormous remote-control tiller glides across a ten-mile long wheat field that has been leveled with nuclear explosives. Overhead, a jet-powered helicopter sprays pesticides. Cattle are housed in skyscraper feedlots. Underneath the soil are sensors which find out when crops need water, and automatic irrigation systems that bring it to them. Far in the background is a city where presumably the people who once lived on the land now reside. If they are employed at all, it is probably on assembly lines or at dull, meaningless clerical jobs, in buildings whose windows are permanently sealed shut. For dinner they probably eat pre-cooked, over-priced foods laced with chemicals.

I should repeat that this vision of the future is not the fantasy of some wild-eyed science fiction writer but the way high U.S. government officials and powerful corporate executives want things to go. It is, moreover, the kind of future toward which existing policies are leading.

Tax laws, for example, strongly favour the invasion of agriculture by large corporations and investment syndicates. They can use losses from farming to offset profits from other sources, a luxury that the genuine farmer does not enjoy. Or they can use investments in land to transform non-farm profits into capital gains, a form of income that is taxed at half the normal rate. Several of the Wall Street sodbusters also receive tax breaks of a different sort — they are oil companies that benefit from the oil depletion allowance and other generous loopholes. For example, our old friend Tenneco not only paid no federal income tax in 1970, it actually would up with the federal government owing it 20 million dollars. Not bad for a company with profits that year of 100 million dollars!

Then there are the federal crop subsidies (often for *not* growing crops) that reward big corporations far more than the small family farmer, the farmworker or the sharecropper. In 1970, the J.G.Boswell Company of California received federal subsidies totalling 4.4 million dollars; Tenneco got 1.5 million dollars, and the list goes on like that. This, in spite of the fact that there is a 55,000 dollar ceiling on the subsidies that any one farmer can legally receive. Be sure the big boys know how to get around such limitations.

Another policy that favours the giant corporations: dams and irrigation canals that carry year-round water to private landholdings, regardless of size. When Congress first authorized the reclamation programme in 1902, it specifically stated that no water would be delivered to farms exceeding 160 acres, or to farms whose owners did not live on or near the land. The decision to limit the benefits of federally-subsidized irrigation projects to small owner-occupied farms was a wise and farsighted one, but it has been all but ignored by the Interior Department.

Fortunately, not everyone accepts the government's idea that big-scale corporate farming is the wave of the future. Most farmworkers and sharecroppers that I have talked to want to stay on the land if they can earn a decent living. Several have started cooperative farms to show that there is an alternative to welfare and city slums. Family farmers have also been raising hell about the corporate invasion of agriculture — though not as much hell as they should raise. Organic Farmers in particular have demonstrated that there is an alternative to large-scale 'factories in the field' that is ecologically sound and economically viable.

But the sad fact is that the tide is far from being turned, and unless we turn it soon there will be no way to stop it. Organic farms and cooperatives provide a model of what the future can be. But we need more than models if we are to stop the corporate takeover. We need new laws — laws with teeth in them that will give the land back to the people who live and work on it.

First, we need new tax laws that don't reward the speculators, tax-loss farmers and giant conglomerates. Perhaps we should eliminate the preferential treatment for capital gains, the oil depletion allowance and other major loopholes. Perhaps we should have progressive property tax that falls most heavily on large landowners, and lightens the burden on owner-occupied homes and small farms.

Second, we need to end the subsidies to big corporations. If there must be subsidies (and there probably should be to stabilize farm income), they should go to the working farmers who need them most.

Third, we need laws that restrict the use of toxic chemicals and set standards for organic products.

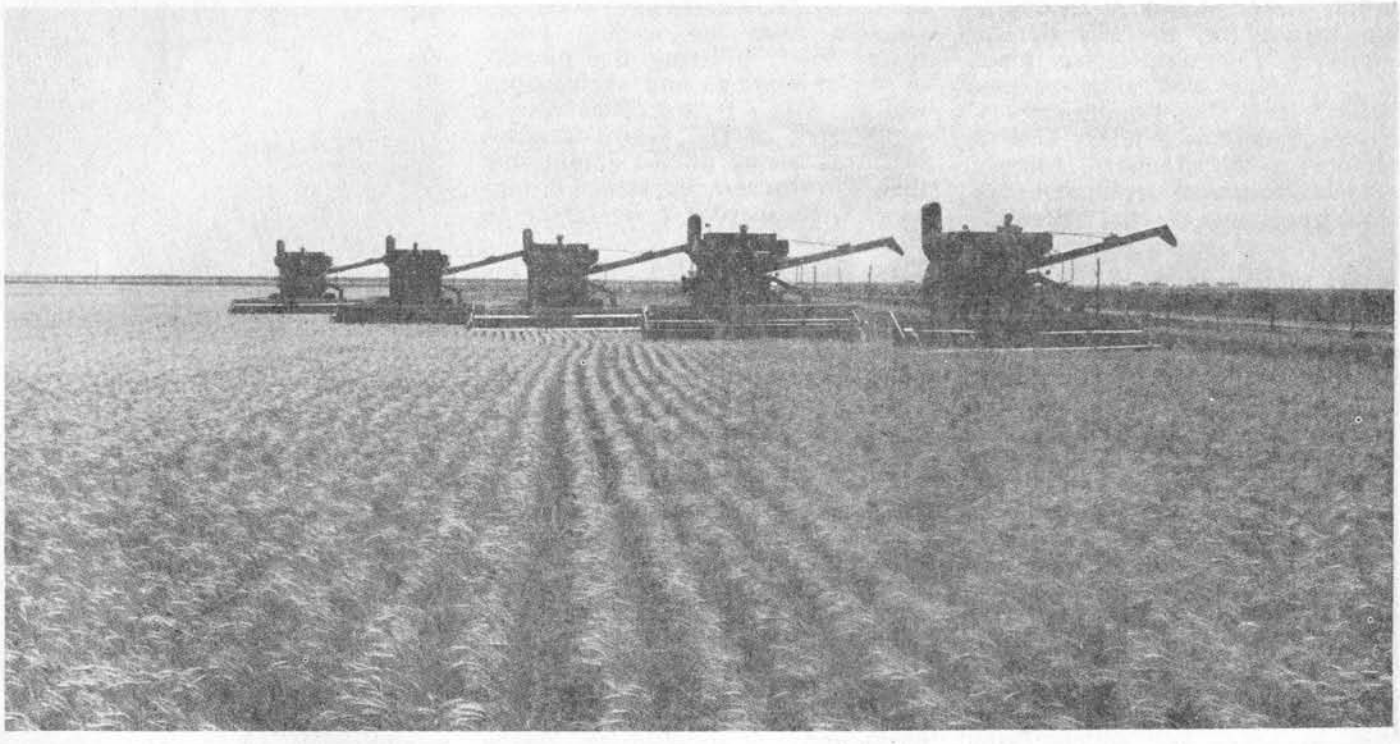
Fourth, we need laws to strengthen the 160-acre limitation and the residency requirement in government irrigation projects. Senator Fred Harris of Oklahoma has introduced a measure that would enable the federal government to purchase large landholdings in reclamation areas and re-sell them in family-sized parcels — as Congress originally intended. It's a good bill that ought to be passed.

Fifth, we need new anti-trust laws to get the corporations out of agriculture. One such law would be the Family Farm Act, introduced by Senator Gaylord Nelson and representatives of both political parties.

Sixth, we need a Homestead Act for the Twentieth and Twenty-first centuries that will put people back on land that belongs to them. The government can't give out free land any more, but it *can* purchase and re-sell lands in rural areas, just as it does in urban areas (where it's called 'urban renewal'). It can also provide for re-sale on terms that a poor person can afford. This might be done the way some colleges make loans for tuition: the student agrees to pay back a fixed percentage of his future earnings. If he gets rich, he pays back a lot; if not, he isn't overburdened with debt.

Of course, it's easy to propose new laws, but a lot harder to get them passed. The big agribusiness corporations are very powerful politically. They have friends throughout Congress and the executive branch — for example, the new Secretary of Agriculture, Earl Butz. They contribute heavily to political campaigns. They hire lobbyists who are expert in the ways of Congress and the state legislatures. Only a broadly based and well-coordinated effort of concerned citizens throughout the country stands a chance of overcoming that kind of power.

The important thing is that we all get involved. Family farmers, farm-workers, sharecroppers, organic growers and consumers, environmentalists, clergymen, doctors, labour leaders, students and anyone who has enough common sense to see that present trends are leading to disaster. We must all campaign for reform. We must bring pressure on our political representatives and become so vocal and so strong that our voice cannot be ignored. If we don't we will wake up one morning and find the American countryside looking like it does in that *National Geographic* picture.



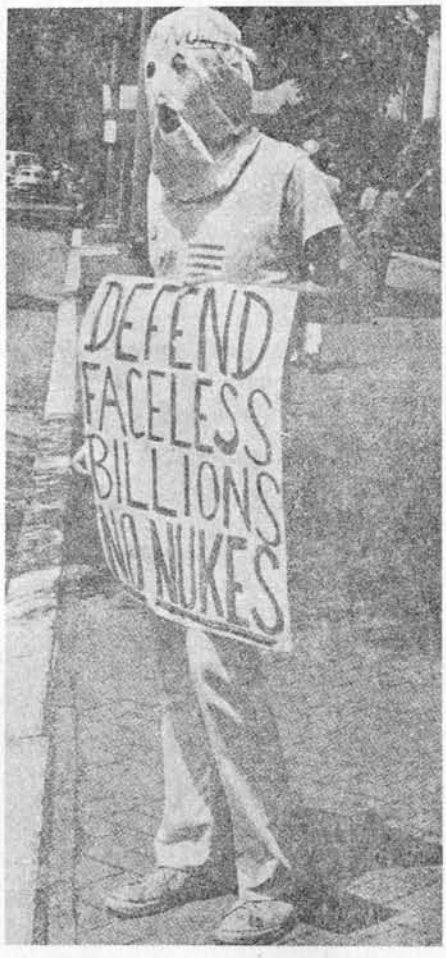
Enormous machines glide across miles of steadily deteriorating wheatlands . . .

Reprinted from: *The New Food Chain: an Organic Link between Farm and City,* Edited by Robert Rodale, Rodale Press 1975.

SUPPORT the family farmer. For more information and offers of help contact The National Coalition for Land Reform, 126 Hyde Street, San Francisco, California 94102.

Seabrook: where do the Clams go now?

The fight against nuclear power in the United States.



Less than three weeks after it ordered an 'indefinite halt' to the construction of the controversial nuclear power station at Seabrook, New Hampshire, the US Nuclear Regulatory Commission has given the go-ahead for work to be resumed on the plant. The Commissioners' decision comes as a bitter blow to members of the Clamshell Alliance — Seabrook's most active and vociferous opponents — who hailed the original ban as 'the beginning of the end for nuclear power in the United States.'

The NRC's about-turn is the latest development in a three year legal battle between the Environmental Protection Agency (EPA), various opposition groups and the Public Service Company (PSC), the major shareholder in the consortium that is building Seabrook. Sadly a major villain in the drama is the EPA, supposedly the environmentalist's staunchest institutional ally.

Since it was granted planning permission by the NRC in 1976, Seabrook has been the subject of a heated dispute over its proposed cooling system. The Public Service Company plans to cool its twin 1150-megawatt reactors by drawing water through a pipe stretching three miles out into the Atlantic and returning it, 39° hotter, back into the sea. Whilst the PSC maintains that the system is more efficient than conventional designs, objectors claim that it will wreak havoc with local marine organisms, disrupting the ecological balance of the coastline and destroying the salt-marshes where the plant is being built — thus violating federal pollution standards.

This issue was supposed to have been resolved in 1974 — two years before planning permission was granted — when the EPA ruled that *all* nuclear power plants must build concrete cooling towers which dissipate heat through evaporation. For reasons never made public, however, the EPA decided in 1975 to make Seabrook the exception to this rule and, on its advice, the NRC granted preliminary planning permission — even though no in-depth study had yet been made on the likely consequences of sea-water cooling. Fearing that the EPA would change its fickle institutional mind, the PSC sought permanent exemption from the cooling tower requirement, initiating nine months of public hearings and negotiations with the EPA's Boston office. Meanwhile work on the Seabrook plant was speeded up on the assumption that the further construction advanced, the harder it would be to stop the plant.

In November 1976, the EPA's Boston representative, John McGlennon, ruled that the 'once through' cooling system was a potential environmental danger, and that the company's construction permit was therefore invalid. The PSC immediately appealed against the decision, taking their case before a new EPA administrator, Douglas Costle, who had been appointed after the election of President Carter. Costle ignored totally a study commissioned by the EPA (and published just before he took office) in which three independent experts had fully endorsed McGlennon's findings. Instead he chose to keep the whole untidy affair within the family and selected a new panel, made up entirely of members of the EPA, which (predictably) decided that McGlennon's judgement had been wrong. The NRC agreed and the PSC's construction licence was reinstated. Once again work resumed at Seabrook.

Costel's decision was challenged by the two local opposition groups, the New Hampshire Audubon Society and the Seacoast Anti-pollution League. In March this year, they won a ruling from a Boston federal court that the EPA had acted illegally, both in excluding independent witnesses from the panel and in refusing to allow outsiders to cross-examine its members. The NRC was thus obliged to conduct a search for alternative sites and the EPA was directed to convene new hearings on the cooling system. The man to chair them? None other than Douglas Costle.

Despite the court's ruling, which had invalidated (yet again) the PSC's construction licence, work continued full blast at Seabrook. Peter Bradford, of the NRC, has since admitted that this was in open violation of federal planning laws. Nonetheless it was three months before the NRC acted by banning, albeit temporarily, further construction at the site.

Clamshell formed

It was against this background of bureaucratic ineptitude that the Clamshell Alliance was formed, not only to oppose Seabrook but also to galvanise public opinion against nuclear power in general. On both counts its success has been phenomenal. It has spawned hundreds of anti-nuclear groups right across the United States and, perhaps most important of all, it has pioneered novel tactics of non-violent civil disobedience that are now being adopted by opponents of nuclear power throughout the world (see Torness report).

Clamshell's first show of strength came in May 1977 when two thousand of its members occupied the Seabrook site. New Hampshire's Governor, Meldrim Thomson, a right-wing Republican and diehard supporter of nuclear power, promptly called out his State troopers who arrested fourteen hundred of the

demonstrators for trespassing. To the utter dismay of local police (and to the chagrin of the Governor) all those arrested refused to accept bail. Their subsequent imprisonment generated a flurry of publicity for the Alliance and its cause.

The Seabrook occupation rapidly triggered off further acts of civil disobedience by affiliated groups across the country. At Rocky Flats, Colorado, six thousand demonstrators staged a sit-in on a railway to block trains entering a nuclear weapons facility; at Barnwell, South Carolina, protesters occupied the site of a proposed reprocessing plant; in New York arrests were made when demonstrators picketed the United States mission to the United Nations during the recent disarmament conference.

Early this spring, Clamshell revealed plans to re-occupy Seabrook in a mass demonstration to be held on the site. Supporting protests were organised throughout the United States and, as an expression of international solidarity, the British 'Stop Urenco' movement announced that it would hold a march against the uranium enrichment plant at Capenhurst, Cheshire on the same day as the Seabrook demonstration. In the weeks preceeding the planned re-occupation, Clamshell formed local 'affinity groups' where its members were briefed on the techniques of non-violent civil disobedience and their legal rights in the event of arrest. The groups also practised what has come to be known as 'role-playing' — rehearsals in which some people play National Guardsmen, whilst others play demonstrators, in an attempt to anticipate what might happen were the demonstration to turn nasty.

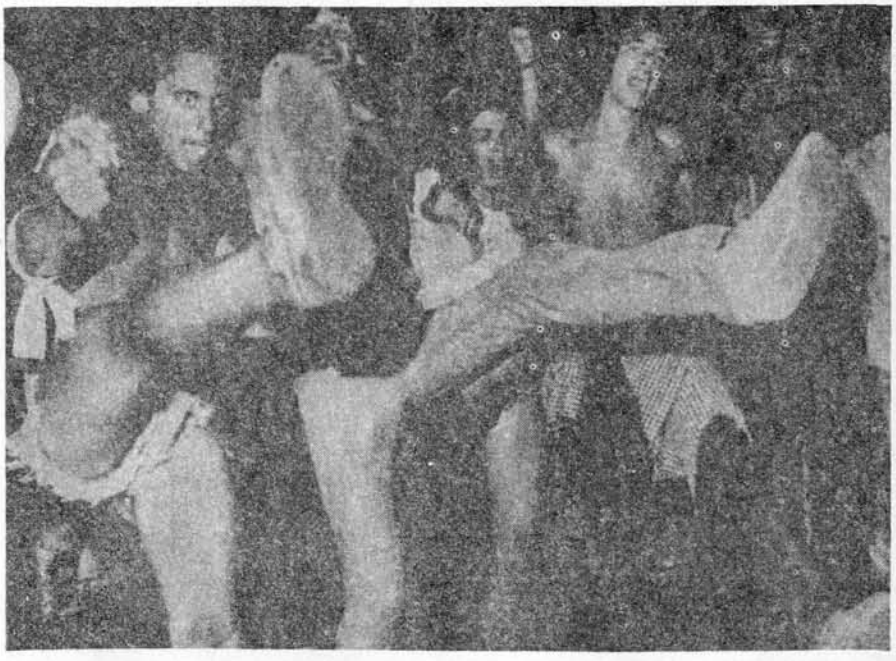
In the event the training proved unnecessary. Two months before the date scheduled for the protest, Clamshell received an offer from New Hampshire's State Attorney, Thomas Rath: rather than occupy Seabrook and face arrest, why not hold a legal demonstration on a site approved by both the State and the Power Company? The proposal went out to all fifty of the Alliance's local chapters, who decided, after much deliberation, to accept the offer — provided that the PSC agreed to hold an evacuation drill and to discuss publicly its plans for handling wastes from the plant. These counter demands were widely interpreted as a round-about rejection of the State's offer.

'We were in this public relations box,' Cathy Wolff, one of Clamshell's organisers, told Gail Robinson of *Environmental Action*. 'If we moved towards rejection, we were painted as unreasonable . . . But the risk of acceptance would be the appearance of co-option.' Worse still it would require drastic changes of plans, including abandoning the group's strongest tactic — civil disobedience and arrest.

Nonetheless Clamshell's Steering Committee agreed, at the last moment, to accept Rath's offer — a decision for which they were criticised by many of the local groups who accused them of acting undemocratically. The Alliance's original plans were scrapped and it set about preparing the alternative site for a three-day 'Energy Fair' and mass rally in June. It turned out to be the biggest anti-nuclear jamboree that the USA has yet witnessed. More than twenty thousand people crammed onto the 18-acre site — a municipal rubbish tip — to see the exhibits and to hear speeches by trade union leaders, scientists and celebrities opposed to nuclear power.

A major factor behind the decision to accept Rath's offer was a local belief that the Alliance's cause would be best served by 'going legal'. 'Local folks who had been strong supporters of the fight against Seabrook came to us and said that they felt there are really a lot of 'closet Clams' around who wanted something they could participate in without risking arrest,' comments Cathy Wolff. Local reluctance to get involved in the hard politics of civil disobedience is understandable: protesters at the rally heard accounts of how local supporters of Clamshell had become victims of official and unofficial harassment. 'The pressures were very subtle,' writes George Zachar for *Critical Mass*. 'Residents who offered support to the demonstrators or who provided land for staging areas, camp sites and communication centres discovered that they were being watched and followed. Some found their tax assessments were inexplicably raised. Others had their land threatened with seizure.'

Despite this, local opposition to Seabrook, which has always had majority support continues to grow. Indeed by keeping within the law the Alliance has found that it has achieved 'a quantum leap in support'. No longer can it be denounced as a 'lawless mob' — a phrase previously bandied about by an influential local paper, the *Manchester Union Leader* — and its cause suddenly gained a new air of respectability. Even the local district attorney, a renowned hard-liner over 'law and order', now felt able to speak out publicly against the plant, something that would have been unthinkable if Clamshell had gone ahead with their plans for re-occupation.



Credit: UPI

Demonstrators celebrate the NRC's decision to close Seabrook. A month later the plant re-opened.

The NRC's U-turn

Immediately following the Seabrook demonstration, two hundred members of the Seabrook Natural Guard (a wing of Clamshell) converged on Washington to hold a vigil outside the NRC's central office. Inside a committee was (somewhat belatedly) discussing whether or not work should be halted at Seabrook following the Boston federal court's decision in March. Apart from a spate of arrests after sixty people staged a 'die-in' (pretending to die from the effects of radiation), the vigil passed without incident. In the evening of June 30th, an NRC spokesman emerged to announce that it had been decided, by a 2-1 majority, to suspend the PSC's construction permit as from July

21st. The permit would not be reviewed again until the EPA had finished its new report on the plant's cooling system *and* the NRC had completed its own review of alternative sites. The demonstrators outside the building were ecstatic at the news, dancing in the streets and hugging policemen and NRC officials. 'We're going to move on to another reactor and yet another and yet another until we close them all down', announced one jubilant member of the Natural Guard. Governor Meldrim Thomson was not so delighted: he denounced the decision as 'assinine' and threatened to sue the NRC. As for the Public Service Company, it seemed so fed up with the whole affair that it announced that it was willing to start building a wind generator at Seabrook.

The justification the NRC gave for its June ruling makes a mockery of its decision, barely a month later, to allow work to be resumed on Seabrook. One of the principal reasons why work was being halted, said a spokesman at the time, was so that the Commission could 'preserve its freedom to decide on alternative sites'. The NRC did not want to be blackmailed into accepting Seabrook simply because such massive sums of money had already been poured into its construction that it would make economic nonsense to stop the project and switch it to another site. 'Dropping the site comparison now,' the Commission ruled, 'merely on the basis that events have advanced too far would mean that no matter what errors were committed, no matter what warnings have been received, if enough work is done quickly enough, the facility is an accomplished act, whether the National Environmental Protection Act has been complied with or not. That is unacceptable.'

It was this insistence that the NRC must be given as much time as it wanted to review alternative sites that caused such jubilation amongst the demonstrators. For whilst the EPA's report was expected in early August (though many felt that Costle would avoid criticism of undue haste and hold on to it until September), the crowd was informed that the NRC's Licensing Appeals Board was unlikely to begin considering evidence on alternative sites before *'the late Fall'*. By that time, further construction work might indeed be economically unfeasible. As George Zachar explained in *Critical Mass*: 'PSC's shaky financial status (has been) highlighted by its recent inability to float bonds to finance the mammoth construction project. The firm is having trouble attracting investors because of cost overruns and regulatory hassles that have reversed the decision to build Seabrook eight times.' Indeed the plant, which was originally expected to be built for less than one billion dollars, has already cost 2.3 billion dollars — and each month that construction is delayed adds another 15 million dollars to the bill. 'We are hoping the delay will cripple the project, forcing the PSC to end it,' said a spokesman for Clamshell. 'We're trying to put them in a worse financial situation. That's their softspot.'

And then in August like a bolt from the blue the NRC made its decision to reinstate the PSC's building permit. The ruling was based almost exclusively on the EPA's favourable report on the plant's cooling system. The NRC's own review of alternative sites, about which so much fuss had been made the month before, was simply glossed over. It was baldly stated that a full appraisal of all possible sites had been made and Seabrook had been found the most acceptable. How had the NRC managed to complete a report in a month which the Commissioners themselves had said would take three months? Since when has early August been 'late fall'? Or are we to conclude that the June ruling was an elaborate charade, a sop to the Clamshell Alliance that would give the illusion that the NRC actually takes its duties seriously? Why else was the PSC going full steam ahead with work on Seabrook right up to the moment that the July 21st ban came into force? Does it make economic sense for a company that is almost bankrupt to be pouring money into a project whose very future hangs in the balance? Or did the PSC know all along what the final outcome of the NRC's 'deliberations' would be?

Two groups have appealed against the decision to the Boston first-circuit court. Whatever the outcome of this latest round in the legal battle over Seabrook, two things are certain, Clamshell is unlikely to fall for the NRC's soft-soaping tactics again; and also of course these events have hugely increased the strength of the anti-nuclear campaign in the United States.

Sources:
George Zachar, *Critical Mass*, July 1978, Gail Robinson, *Environmental Action*, July 1978 and *Time*, July 17th, 1978.

For further information, contact: The Clamshell Alliance, 62, Congress Street, Portsmouth, New Hampshire, USA 03801.

Scotland

Torness Occupied

Since this article was written the Scottish Electricity Board has bulldozed Half Moon Cottage into the sea. Nineteen members of the Torness Alliance have been arrested and charged with Trespass and Breach of the Peace.

Members of the Torness Alliance are now firmly ensconced on the site of the proposed Torness nuclear power station, which they occupied on September 30th, the date on which local farmers reluctantly surrendered their land to the South of Scotland Electricity Board (SSEB). The protesters have devoted much of their time to renovating Half Moon Cottage, a derelict croft slap in the middle of the site, both as a symbolic act of restoration and as a practical step towards ensuring comfortable living quarters for the coming winter. The cottage has become the focal point of the occupation and its strongest asset: as Rob Edwards of the Scottish Campaign to Resist the Atomic Menace (SCRAM) put it to *The Guardian*, ''They can't build the power station without knocking down the cottage first''. The protesters intend to resist all attempts by the SSEB to start work on the site, but stress that there will be no violence on their part.

Work on the cottage is already well advanced. The floors have been cleaned up and flagstones, supplied by local builders who are advising them, have been laid. Sections of the walls which had collapsed are being built up so that a wooden frame can be constructed to take a temporary corrugated iron roof. A wood-burning stove has been installed and has been used to bake bread and other dishes, including a birthday cake for one of the protesters. A windmill has been erected, and chickens and goats are being kept.

Credit: SCRAM

Renovating Half Moon Cottage

The decision to occupy the site was not taken lightly. After much deliberation, the Torness Alliance decided that civil disobedience was the only option open to them given the clear determination of Bruce Millan, Secretary of State for Scotland, to grant the SSEB planning permission for the proposed plant — whatever the objections. Something of his intransigence was shown by his outright rejection of a motion, passed by the Lothian Regional Council, calling on him to reconsider his decision not to hold a public inquiry on the proposed plant. He simply replied (through his secretary) that he did not think that it raised any issues to which he had not already given consideration. The fact that the motion came from the *elected* representatives of the local community evidently struck him as of little consequence.

Not surprisingly, the Torness Alliance have found a wealth of support amongst the local people. Some have invited the occupiers to their homes to have baths (there are no washing facilities on the site), some have given food, and farmers have sent vegetables to supplement what they are growing in their own kitchen garden. The protesters have also been loaned a pick-up truck, a van, building tools, a gas boiler, a gas ring and cylinders.

The estimated cost of the proposed Torness Advanced Gas-cooled Reactor (AGR) is £742 million, making it one of the biggest spending projects in Scotland's history. Originally it was thought the SSEB were only thinking of building one 1320Mw reactor but it now emerges that they have planning permission for "up to 5280Mw of capacity" — in other words, for four reactors. "This means that the public has no effective say as to whether [the three extra reactors] should be built," says SCRAM in its newsletter. "The Secretary of State does have to authorise expenditure and nuclear site licences have to be granted — but these are not processes in which the public plays any important part . . . *Under planning law there is nothing the public can do to prevent Torness from becoming Britain's hugest and most horrifying nuclear complex.* The SSEB have been quietly fostering the idea that they have only one reactor in mind for Torness. The revelation that they in fact have permission for four can only anger people. We are not prepared to be conned into accepting such a massive and dangerous plant." SCRAM also point out that the SSEB already have at least twenty per cent excess capacity — and that there is good evidence that their forecasts of future electricity demand have been exaggerated.

So far the only official visits the protesters have received have been from a few local policemen who have proved very friendly, even staying to chat over cups of tea. The SSEB have made no moves to reoccupy the site but, should they do so, the Torness Alliance have drawn up contingency plans for bringing in supporters as fast as possible.

The most vociferous condemnation of the occupation and the activities of SCRAM appeared in a bizarre article published in *The Daily Telegraph*. The author, Robert Moss, founder of the National Association for Freedom, tried to link the anti-nuclear movement with an international plot to overthrow capitalism. "In Britain all the major Trotskyite groups are opposed to nuclear energy," Moss writes. "The current focus for the anti-nuclear campaign is in Scotland and the North of England, where recently created organisations like the Scottish Network to Resist the Nuclear Menace (SCRAM) (sic) are active." Apparently he believes the aim of the anti-nuclear groups is to assist the Soviet Union in its "long-term strategy to deprive the West of automatic access to fuel". Needless to say members of SCRAM have no group political affiliation.

The protesters at Torness welcome anyone who wishes to join them, stressing only that the occupation is a non-violent one. Anyone who would like to support the campaign should first contact SCRAM at 2a Ainslie Place, Edinburgh, Scotland. We wish the occupiers all success and a happy Christmas.

Switzerland

Freedom or Ease?

If proposed amendments to Swiss nuclear law are carried through, the State will be able to use compulsory purchase to acquire sites for dumping nuclear waste, and Switzerland's long-established tradition of direct democracy will be seriously threatened. Next February a national referendum will be held to confirm these changes which have already been tacitly agreed by both chambers of the Swiss parliament.

An opposition group has been formed and, at a press conference in Zurich, its President, a Basle city councillor, warned that the amendments would deprive local communities of important constitutional rights. In effect the State (or even private interests such as the electricity industry) will be empowered to carry out test borings and to purchase sites without local agreement. A letter pointing out these dangers has been sent by the group to all Swiss communities.

The group argues that nuclear waste disposal should not be treated as a national problem; it is the private concern of the electricity industry and it is up to them to solve it. The nuclear industry had got itself into an impossible position and

was now trying to wriggle out by shifting the burden of responsibility on to the local communities. Considerable sums of money in the form of grants and tax reliefs have been offered to certain authorities in an attempt to persuade them to accept test borings, but so far all those approached have rejected them.

One expert member of the group is Professor M. Burri, a geologist at Lausanne University. He stated that neither the Alps nor the Jura fulfilled a single condition proposed by the United States Atomic Energy Authority for suitability for waste storage. He stated: 'In relation to its geological stability for the next million years, Switzerland is one of the least safe places one could imagine.'

There was criticism too from the Swiss Forum for the Responsible Use of Science. It has questioned statements made in a recent report that nuclear waste disposal is 'feasible', pointing out that the report contains not a shred of geological, hydrological or even laboratory evidence to support its thesis. Moreover the problem of intermediate waste storage had not even been considered.

The President of the group warned against the probability of NAGRA (a government body concerned specifically with nuclear waste disposal) initiating a propaganda campaign to minimise the dangers. It was up to the local communities to keep Switzerland free of nuclear waste. They should resist pressure to accept unknown risks, especially as the need for nuclear power was still unproven.

Swiss voters still have the chance to show how much they care about their future and the future of democracy in their country when the whole issue is put to the vote at the national referendum in February. The Minister of Energy, Dr. Kiener has made it quite clear how crucial he believes the vote to be: 'Rejection of the proposed amendments will mean the end of nuclear power construction in Switzerland and the halting of work on the nuclear power station at Leibstadt.' Although Dr. Kiener expects Parliament to recommend that the amendments are accepted, it is difficult to judge how the final voting will go. Switzerland is a country of contradictions; a country with a great love of comfort and affluence, but also a country with a strong tradition of individual freedom and local decision making. Will love of freedom be sacrificed to love of ease?

Paul Carline

Liberals Debate Ecology

A wet nothing

The Liberal Party spent one session of its Annual Conference at Southport discussing a motion on 'ecological issues'. It was a sad day for ecology.

The motion itself was a remarkable piece of political jargoneering. It 'believed', 'recognised' 'affirmed' 'stated' and 'pledged' many splendid ideas and ideals but, incredibly, contained not a single proposal for action by government, Liberal or otherwise. The shortcomings of the motion were well recognised by Liberal ecologists, who have formed themselves into L.E.G., the Liberal Ecology Group. There was discussion among L.E.G.'s small but growing membership on the matter of how to cope with the motion: defeating it would indicate that the Liberal Party is wholly in favour of growth, referal back might give a similar impression, yet passing a motion described by speakers in the debate as 'a wet nothing', 'a mish-mash' and 'a lump of flob' would make the Liberals a laughing stock in Ecological Circles. In practice with an election in the offing there can never have been much doubt that the motion would be passed. It contained the sort of high sounding stuff that might pull in drifting voters, and very little to scare anyone off.

Tony Beamish, chairman of L.E.G., spoke for an amendment, which, if it gave the proposals no teeth, at least it cured some of the gum disease (still no proposals for government action). Paul Tyler, P.P.C. for Bodmin, spoke for the motion itself, and did little to improve things. The chairman felt constrained to ask him twice to curtail his speech since he had overrun his time. He just managed to tuck in a few words about growth at the end, under the chairman's impatient eyes, having totally failed to give it its proper central place in a discussion of Ecology. The Young Liberal Bulletin for the day was revealing: it spoke of 'Poor Paul Tyler, who is eager to score points against his Ecology Party opponent in Bodmin . . .'.

Nor was the remainder of the debate any compensation. Clearly there are true ecologists in the Liberal Party trying very hard to get their views across. But the conspicuous lack of Liberal Party 'Big Names' on the platform, the number of delegates who walked out during the debate, and the desultory nature of the applause, all gave the impression that most Liberals neither know nor care to know about ecology. And those that were interested must have been a trifle confused when the debate moved on to Fire regulations in Liverpool!

All through the debate an imported Japanese car stood outside the hall, first prize in a raffle for Liberal funds. One delegate I spoke to saw it as a symbol that Free Trade was alive and well, which was how he thought it ought to be. He didn't speak against the ecology motion, because he simply didn't realise the implications of ecology for Free Trade or a thousand and one other things. That's probably where most Liberals stand on ecology at the moment; when it's presented to them as a 'wet nothing' they'll vote for it; when they begin to realise its implications, they can be expected to start fighting back.

Keith Rushworth

Nuclear Power Rejected

Austrian triumph

There is a glimmer of light at the end of the tunnel! At last a nation has said 'No' to its government's plans for nuclear energy. On November 6th, over half of Austria's five million electors voted in a national referendum to reject nuclear power.

The result has provoked a crisis within the ruling Socialist government, which firmly believed that the people would endorse its plan to put Austria's first nuclear power station into operation. It must now decide what to do with the almost completed plant at Zwentdorf on the Danube just twenty miles upstream from Vienna. So far the project has cost £250 million.

When will other 'civilised' countries give their people the right to decide on the nuclear issue?

La Hague: chaos reigns supreme

At the very tip of the Cotentin Peninsula, just fifteen miles from the Channel Islands, lies Cap de La Hague, the site of France's largest reprocessing plant.

Identical in design to British Nuclear Fuel's plant at Windscale, La Hague has had a dismal history of accidents, leaks and near-disasters since the day it was first commissioned in 1965. Local opposition to the plant continues to mount, but plans are already well advanced to extend the reprocessing facility and to build four nuclear power stations at nearby Flamanville.

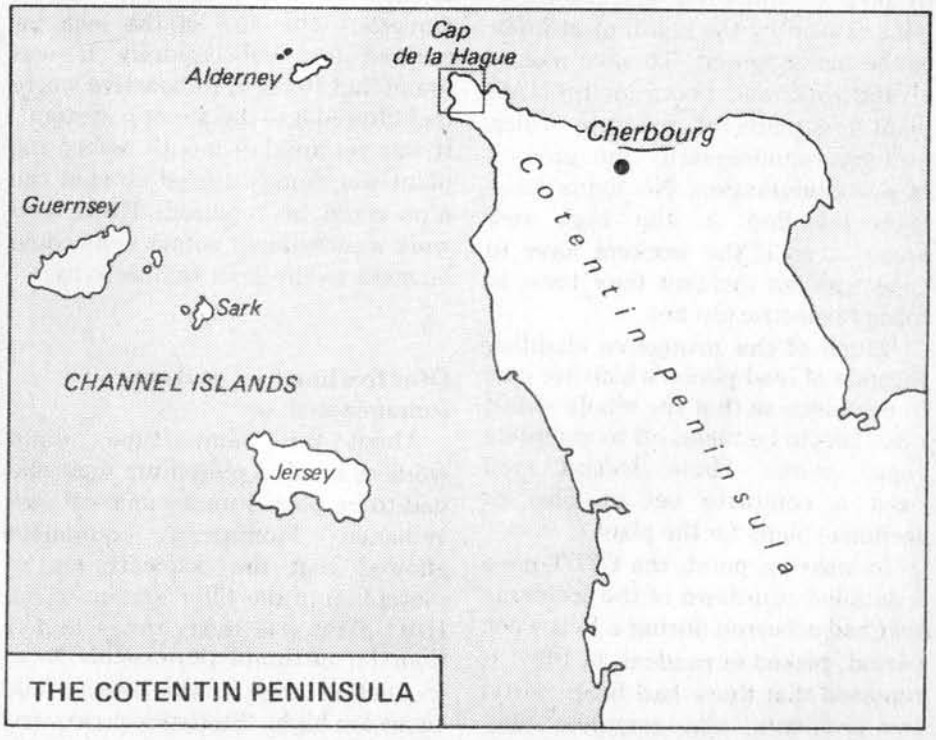
La Hague was originally built to treat the spent fuel from the French-designed Natural Uranium Gas-Graphite (NUGG) reactors. In 1976, a High Activity Oxide (HAO) plant was added to take in fuel from the second generation of French reactors, the Pressurised Water Reactor (PWR). The trials for HAO which lasted only six weeks before the plant was put into full production, were made with spent fuel from a Swiss Boiling Water Reactor which was less radioactive than fuel from the PWRs. The plutonium extracted through reprocessing is now being stockpiled for use in France's Rhapsody, Phoenix and Super-Phoenix Fast Breeder Reactors.

Foreign Waste Floods In

COGEMA, the company that owns La Hague, is now busily expanding its facilities so that it can take in foreign spent fuel for reprocessing. The decision to go ahead with the scheme — which will involve La Hague trebling its capacity to reprocess 2400 tonnes of nuclear waste a year — was taken by the French Government in July last year. At first it is expected that sixty-five per cent of the fuel reprocessed will be from Japan, although France has also signed massive contracts with Germany and Sweden to treat their nuclear waste. Indeed, one of the chief outcomes of Prime Minister Barre's recent trip to the Soviet Union was a study of possible reprocessing deals between the two countries. 'To date foreign contracts commit COGEMA to reprocessing 3000 tonnes of spent fuel from abroad by 1980. The Atomic Energy Commission . . . makes patriotic noises whilst increasing its profits by signing dishonest contracts which it cannot fulfil', comments the French ecological magazine, *Le Gueule Ouverte*. Already there is a backlog of 1000 tonnes of spent fuel from French reactors which must be reprocessed as soon as possible since the fuel rods are corroding and emitting fissile material through minute cracks.

Money Before Safety

The Confederation Francaise Democratique du Travail (the trade union representing workers at the plant) has strongly criticised COGEMA's plans for expansion. In a submission to an inquiry into health and safety at La Hague, the CFDT argued that the plant had not yet been proved capable of treating oxide wastes on a commercial scale, and that no extension should be carried out until the process had been perfected. They also charged that commercial considerations are being allowed to come before safety, and demanded not only that all foreign contracts be annulled but also that restrictions be imposed on the building of new reactors in France until the nuclear industry can demonstrate its capacity to treat the wastes. 'It is clear that the management of COGEMA has chosen to consider the reprocessing of spent fuel as a simple commercial operation whose success is obtained by obtaining juicy contracts,' says



THE COTENTIN PENINSULA

the CFDT in its report. 'We are totally opposed to this conception.'

So lax is the management and so slipshod its approach to safety that incidents are now commonplace. 'What used to be an exceptional procedure has now become routine,' say the CFDT. Their report goes on to catalogue the extent of the chaos at La Hague. 'Whatever their age, the buildings are designed to cope neither with normal tasks nor with 'incidents'. Most of them are too small and the designers have never bothered to consult the workers who operate them — so the same mistakes have been made over and over again. Indeed building materials are often used which have already been proved inadequate.

Nuclear waste in entrance halls

'Originally the long-term storage of wastes was not even considered a possibility, so when the present backlog began to pile up we had to improvise by using the entrance halls of the buildings. One cooling pond is too small to contain the spent fuel rods from the PWRs so they are stored on the ground in vinyl wrappings. This same pool was so constructed that it is impossible to treat the water in it. The ventilation system in the High Activity Oxide plant doesn't work if the doors are open.

'On top of the difficulties created by poor design there are the problems caused by the skinflint attitude of the management. To save money all the walls and floors in the HAO plant are made of concrete which prolongs unnecessarily the process of decontamination. No lights have been installed in the high risk areas — so if the workers have to cope with an incident they have to bring in electric torches.

'Much of the protective cladding is made of lead plates which are cast in one piece so that the whole shield often has to be taken off to complete repair works. There doesn't even exist a complete set of files or technical plans for the plant.'

To make its point, the CFDT gave a detailed run-down of the incidents that had occurred during a four week period, picked at random, in 1977. It reported that there had been: forty-two accidents; nine complete stoppages of the HAO unit, lasting eleven days; five evacuations due to contamination; seven days lost through decontamination (during which ten incidents occurred); and only one day without any incidents at all.

Accidents occur almost every day . . . what used to be exceptional procedure has now become routine.

Even when the management does lay down stricter safety regulations, they are subordinated to the needs of commercial production. So long as damage doesn't slow down work at the plant, repairs are given no priority. In July 1976, for example, a leak was detected in part of the HAO plant. A valve was replaced but no other repair work was done because it was thought too difficult to see what was happening behind the protective cladding. Six months later, the leak reappeared, but this time the order was given to continue maximum production. 'Everything was speeded up to the point where serious risks were taken in order not to close the plant', reports *La Gueule Ouverte*. 'The size of the leak increased and subsequently it was found that 10 cc. of radioactive waste had filtered into the sewage system.' It was yet another month before the plant was finally closed so that the pipe could be repaired. Even then work was resumed before tests could be made to check for radioactivity.

Over five hundred workers contaminated.

About the same time, eight workers inhaled plutonium dust and had to be placed under medical surveillance. Monitoring equipment showed that the concentration of plutonium in the filter system of the HAO plant was thirty times higher than the maximum permissible dose. In another area it was nearly 1000 times too high. 'Statistics prove that there are fewer accidents in a nuclear power station than in a factory manufacturing ready-to-wear clothes for women,' commented the managing director of La Hague.

Despite his assurances, it has been revealed that in 1975 alone there were 572 incidents of contamination to workers, of which 205 were internal contaminations. In 1973 there was a total of 280 reported cases. Perhaps it is also significant that deaths from cancer between 1973 and 1975 were twenty-one per cent higher in the Canton of Beaumont (where La Hague is situated) than in the neighbouring Cantons of Cherbourg, Avranches, Coutances and St. Lo.

Marine ecology at risk

If leaks have occurred inside the plant, they have been equally frequent outside. Radioactive wastes are released through a seventy-foot pipe straight into the sea. So far the pipe has broken thirty times, eaten away by acids. On each occasion the wastes have filtered into the soil and contaminated groundwater reserves.

Once they reach the sea, the wastes tend to accumulate in the sediments of sheltered bays — not only in the immediate vicinity of La Hague but, because of the strong local currents, right the way round the North Coast. Recently *Le Canarde Enchaine* disclosed that a secret report by the French Atomic Energy Commission — the CEA — had revealed abnormally high levels of radioactivity in the sea up to sixty miles from La Hague. The report referred to 'the apparently anarchic diversity of the distribution of radioactive wastes in the sea' and warned that the results of its research 'are a great lesson in prudence'.

The area most contaminated to date appears to be Fermanville, some distance from the waste outlet pipe, where levels of Ceasium 137 are four times higher than those in the sediment in bays around La Hague, whilst the levels of Cerium 144 are eight times higher (220,000 picocuries per kilogramme). The streams in the La Hague area are also contaminated: one, from which several herds of cattle drink, was found in 1976 to contain 3,800 pico-

curies per metre of water. Levels of beta emitters in ray fish caught off La Hague were 5.9 pc/gramme, and those off Guernsey were nearly as high, 4.2 pc/gramme. What is particularly worrying is the sudden increase since 1973 of radioactivity levels in crabs and different types of seaweed. Levels remained very low for a long time, then suddenly escalated — very similar to what happened in the vegetation around Hanford. The only explanation would appear to be that the radionuclides in question have undergone a modification, possibly the result of some bacterial action, which has caused them to become very much more soluble in living tissues.

Accidents at sea

In the Channel Islands, only fifteen miles from La Hague, there is growing concern over the rising radioactivity levels in the sea. Almost overnight, the Guernsey Nuclear Action Group (NAG) were able to collect ten thousand signatures — one quarter of the island's population — to protest against the expansion of La Hague. The islanders fear that the forty-fold increase in the amount of radioactivity the plant will have to handle by the 1980s will wreak untold havoc on the local marine life and kill their fishing industry. They also point to the considerable dangers of transporting nuclear waste through what is, after all, the busiest and most hazardous shipping lane in the Western world. Mr. Justice Parker may have scoffed at the idea at the Windscale inquiry, but what if the same fate were to befall a nuclear transport ship as befell *Amoco Cadiz*? What would happen if canisters of waste fell into the sea and could not be retrieved?

Poisoned seafoods

Dissatisfied with the 'less than comprehensive' sampling of radioactivity levels carried out by the British Ministry of Agriculture, Fisheries and Food, NAG invited Dr. Hugh Livingston, from Woods Hole Oceanographic Institute, Massachusetts, to sample seaweed, sand, shellfish, potatoes and soil from seaweed-fertilised fields, as well as the organs of seaweed-eating sheep. The first results for sediment and seaweed indicated a level of plutonium five times higher than expected levels, though lower than those around the Isle of Man.

NAG and its Jersey-based counterpart, CONCERN, also point to the dangers for marine life from the planned PWR reactors that Electricité de France (EDF) intend to build at Flamanville, a short distance down the coast from La Hague. If Flamanville goes ahead, its four reactors will need vast quantities of seawater for cooling. The water would be treated and then discharged into the sea. Beside the possibility of adding yet more radioactivity to the sea, fears have been expressed about the effects of the heat of these emmissions on marine life. It is estimated that some 300 cubic metres of water will be required per second to cool the reactors. Hot water discharged from the Spanish reactor at Vendella, a mere 500 Mw plant, has already sterilised an area of eight kilometres around the outlet pipe — and that area is steadily expanding. At Flamanville, there will be four 1300 Mv reactors.

'It seems clear,' says M. Philiponeau, President of the Group de Brest de L'Institute de la Mer, 'that an ecosystem which is almost at breaking-point due to pollution, risks being destroyed by even a small rise in temperature.'

Strange allies

Although both NAG and CONCERN clearly have the support of the vast majority of the Islands' population, neither the States (the Island parliaments) nor the British Home Office, which represents them in foreign affairs, have shown any interest in the developments at La Hague or Flamanville. There has been no full debate in any of the Island parliaments on the issue, although one Guernsey member has tried unsuccessfully to introduce a private bill protesting against the developments.

Ironically, the islanders' best hope for stopping the French plans may lie in an obscure document produced by Finance Commission of the French National Assembly. In a lengthy report it strongly criticises the rush to develop nuclear power in France, and the lack of public debate on the whole issue. 'Engineers are generally inept at public contact and are often shocked when their views are opposed.' says the report. 'Indeed, opposition to their nuclear plans is the first time that this has happened to them. Normally everyone is contested in their professional lives — except scientists who rarely discuss matters amongst themselves. Yet now they are forming our future and our way of life. That one should not be permitted to examine their choices seems abnormal.'

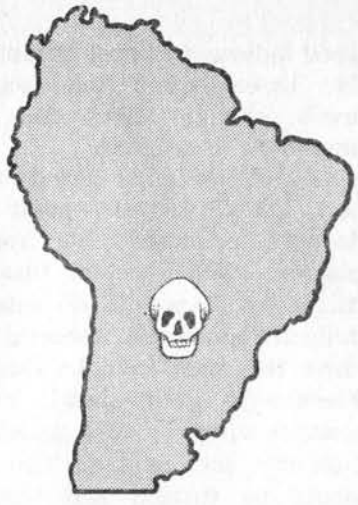
The report goes on to highlight the escalating costs of nuclear power, and argues that this development alone is sufficient reason to reconsider France's nuclear programme. 'The cost of a KwH, as calculated by the public authorities, has risen from 3.83 centimes in 1973 to 9.7 centimes at the beginning of 1977. All elements of the cost have increased strongly. The cost of investment has more than doubled; the running costs have practically tripled; and the same is true for fuel costs . . . of itself this development should persuade us to re-examine objectives which had been previously determined.'

The report ends by calling for the diversification of energy supplies, recommending an extra effort to save energy, and reading the riot act to the nuclear industry for withholding accounts — an offence punishable under the French Finance Act. Whether the Commission's findings will really influence the French government, committed as it is to a headlong dash to nuclear self-sufficiency, remains to be seen. But one thing is certain: a growing number of French officials are beginning to question their government's policy. Ultimately that can only be good news for the people of the Cotentin Peninsula and the Channel Islands.

Edward Goldsmith and Nicholas Hildyard

This report relies extensively on the following sources;
La Hague — impact ecologique de l'usine de retraitment, Comite contre la pollution atomique dans la Hague. *Nuclear Power — Cause for Concern in the Channel Islands,* CONCERN (c/o Mrs. Joy Nursey, Les Talus, La Rigondaine, Grouville, Jersey.) *La Gueule Ouverte 1977/78.*

Heartache in Paraguay



Death camps for the forest Indians

In 1976 a book edited by Richard Arens *Genocide in Paraguay* (Temple University Press) drew attention to the plight of the Ache and Moro Indians, and accused the Paraguayan government of complicity in the extermination of its Indian population. The charges were that these peaceful and primitve people had been hunted like animals — being shot with rifles or hacked down with machetes; that the survivors had been herded into reservations where they lived in conditions of indescribable filth, squalor and poverty; that young males had been sold as slaves; women as prostitutes and children as domestic servants; that those left to die in the camps were denied the right to speak their own language, practise their religious rites, sing their own songs or perform their dances. Treatment which had engendered such feelings of despair, degradation and helplessness that it had utterly destroyed their cultural identity.

The Paraguayan government reacted furiously, denouncing the book and denying the charges. At about the same time they deported six Roman Catholic priests who had denounced the genocide of the Ache; arrested six Protestant missionaries; arrested and tortured at least one seminarian and beat up, drugged and sexually assaulted the members of a group calling themselves *Maranda*, who were attempting to bring food and medical aid to the Indians.

The reason for the Paraguayan government's unofficial extermination policy are obvious. Roads cut through the jungle opened the way for large cattle and lumber interests to move in and the value of land soared in consequence. In pursuit of short-term economic gain the government was not prepared to have its development plans hindered by the inconvenient presence of the Indians whose traditional homelands they wished to sell.

In spite of their loud and indignant denials a report by Richard Arens in *Akwesasne Notes* earlier this year, reveals conditions so frightul that even an 'official' visitor escorted by a government appointed guide and confined to those areas selected by the Director of Indian Affairs, repeatedly saw conditions comparable with those in Nazi concentration camps. While administrators and other officials lived in neat new houses on the perimeters of the reservations, the Indians were invariably crowded into makeshift ramshackle hovels devoid of sanitary arrangements, furnished with nothing more than a few pieces of boarding and some rusty cooking utensils. The stench of human excrement pervaded the Indian part of the camps; and among the miserable old men and women (the young having been sent elsewhere to work) many were chronically ill, too weak to stand, or dying.

A particularly horrifying aspect of Richard Arens' report is the hopelessness, apathy and callousness of the people from whom a civilized world has come to expect courage and dignity — the doctors, the missionaries and the priests. In one camp the nuns were asked whether the Church looked after such matters as the health of the Indians; they replied that the Indians could not 'afford' to pay for medical care. At another a priest agreed that conditions were sad, adding that we had to be patient. He was obviously resigned to a situation he felt unable to alter. At another a shallow mound of earth close by the buts turned out to be the grave of an Indian who had recently died — his relatives had been refused the right to bury him according to their traditional rites in the jungle. In all the camps the rules against speaking their own language, singing their songs and following their traditional culture was ruthlessly imposed although this is totally against the Catholic church policy in Paraguay.

A priest on one reservation was widely believed to have denounced 'trouble-makers' as communists. The attitude of this man to his parishioners was one of jocular insensitivity. He addressed them with such remarks as: 'Hello, you old liar' or 'Buster, you're due for another warning from me.'

'The impression that I gleaned,' writes Arens, 'was that the nuns were liaison officers between the priest, the industry and the police'.

Richard Arens undertook the visit upon which this report is based, at considerable risk to himself and at the insistence of the Paraguayan government. If he had turned down their invitation it would, they said, prove that he was unable to substantiate the charges made in *Genocide in Paraguay*, of systematic extermination of the Indians. Restricted in where he travelled, thwarted in his attempts to discover the truth, spied on whenever he spoke to the Indian people and finally cross-examined in a hostile manner by government officials, Arens nevertheless found in every camp conditions of the utmost squalor; Indians dying without medical care; induced starvation and indifference to the spread of mortal disease; evidence of continuing slavery, and above all the 'psychological death' which results from the intentional deculturization of a whole people. And this on reservations that the Paraguayan government were willing to display. What about those to which access was barred?

'The Indians,' Arens writes 'are upon the threshold of extinction . . . we are witnessing the Paraguayan version of a "final solution" directed against the forest Indians of the land, Ache, Moro, and all the remaining forest Indians who, however indirectly, have blocked the economic development plans of the government of Paraguay.'

Dead Forever

A sixteen acre housing estate at Niagara Falls has been pronounced "dead for ever" — condemned by the New York state health authority as "a great and imminent peril to the health of the general public."

The area, housing 234 families in a middle-class suburb of the town, was developed in the early 1950s from land formerly used as a dumping site by a local chemical company. For more than thirty years, millions of gallons of chemicals had been dumped in drums into a disused canal and covered with clay. But after the houses were built, the drums rusted and the contents seeped into the earth.

Health experts were called in and detected 82 different chemicals — twelve of them known or suspected carcinogens. They found that the area had the highest average rate of miscarriages, cancer and leukaemia in the country.

Tom Quinn, in charge of the environmental task force, admitted "We don't really know what's down there. There's no record of what was dumped or how much of it. This land is dead forever. The trees, grass and flowers in the gardens will eventually go. Nothing will remain."

So much for the benefits of economic growth.

Sunday Times, 15.10.78

Mea Culpa?

International drug companies are promoting and selling drugs in Africa that are considered hazardous in Britain, according to an investigation by the *Sunday Times*. Following up allegations made by John Yudkin, a lecturer at the London Hospital Medical School, they found that:

* Male hormones are being sold for a variety of dubious treatments, including malnutrition and sexual problems, which are not approved in Britain. *Mims Africa*, a drug directory published in Surrey and sent to eight thousand doctors in thirteen African countries, recommended one hormone drug, *Deca-Durabolin*, for treating kwashiorkor. But the Dutch company which manufactures it says that *Mims* is out of date and the drug should no longer be used for kwashiokor. Nonetheless the company still promotes the drug in Africa for the treatment of malnutrition.
* Male hormones are also sold in Africa by Schering AG, a Berlin drug company. It recommends the drug for the male menopause — that is "for reduced efficiency, easy fatiguability, lack of concentration, weak memory, disturbances of libido and potency, irritability, disturbances of sleep, depressive moods and general vegetative complaints." The hormone is also recommended for overcoming "potency disturbances" where deficient male hormones are "not the primary cause".
* *Mims Africa* recommends four hormone drugs for pregnancy testing although use of drugs for this purpose in Britain was banned in 1975 because of risks to the foetus.
* A further potential hazard comes from clioquinol drugs used to treat diarrhoea. Japanese authorities blame these drugs for causing blindness or paralysis in some ten thousand Japanese. The British Committee on Safety of Medicines set a maximum dose of seven grammes for these drugs in 1973, but *Mims Africa* continues to recommend higher doses — and in some cases no limits at all.
* One of the clioquinol drugs, *Mexase*, is recommended for conditions that could hardly be regarded as sufficiently serious to merit treatment with such a powerful and potentially dangerous drug. They include "a feeling of repletion . . . digestive insufficiency due to poor mastication . . . and dietary errors."

Mims Africa describes itself as a "professionally edited index of ethical preparations." Barry Hollamby, its publisher, says: "The details of the drugs we list come from the manufacturers. It has always been their responsibility to update us." Doubts about drugs are often a matter of opinion, he concludes. Recommendations from one nation's medical authorities may not be binding anywhere else.

Sunday Times, 13.8.78

Lead Levels Intolerable

Lead levels in dust at the playground of a South-East London Primary School, opposite a major smelting works, have been found to be 1800 parts per million (ppm). According to Dr. Chubb, senior analyst for the Department of Agriculture and Food at Reading University, levels on the road approaching the smelter were 12800 ppm, and in the moss outside the works they reached 28800 ppm. Professor Derek Bryce-Smith has warned that the lead constitutes a serious hazard to the children at the school, many of whom are already suffering from stomach pains, nausea and severe headaches. Significantly surveys of lead pollution in the area were carried out in both 1972 and 1977 by two local authorities. On neither occasion did they express any concern and, indeed, stated that they "were extremely satisfied with the results".

Even higher levels have been found in Birmingham. A Government study reports that levels of lead in road dust were in the range of 160-50,000 ppm, and that samples from *internal* locations, mostly within houses, ranged from 136-470,000 ppm. Dr. G. Winneke, of Dusseldorf University, found that some seventy-six per cent of Birmingham children have levels of lead in their teeth (a good index of body burdens) within or above the range associated with significant adverse effects on I.Q. and co-ordination.

Chemicals on the Brain

The damage done to the brain by industrial chemicals has been grossly underestimated, according to researchers at the Albert Einstein College of Medicine in New York.

Until recently it was generally assumed that toxic chemicals only affected the peripheral nervous system of the brain — and that damaged nerves would recover if intoxication ceased.

Two researchers, Drs. Herbert Schaumberg's and Peter Spencer, have challenged this theory after finding that n-hexane, a common industrial and laboratory solvent, affected the central nervous system, which will not recover after prolonged exposure.

In cases of prolonged, low-level exposure to n-hexane, Schaumberg suggests, subtle changes may occur to the nervous system vital to memory and vision, and individuals exposed to n-hexane and acrylamide may experience premature deterioration in their mental capacities.

Schumberg's investigations of a group of young Italian women exposed to n-hexane illustrate his depressing findings all too clearly. The women employed in 'cottage-industry' shoe factories near Naples worked long hours in small, poorly ventilated rooms. Rags saturated with a solution containing n-hexane were constantly handled in the daily course of work.

In one case, a woman developed cramping sensations in her hands, accompanied by weight loss and symptoms of anorexia. Two weeks later, she began to feel cramp in her calves and developed an unsteady gait which was only improved by the wearing of high-heeled boots. After a further two months, the legs weakened, the toes became numb and she collapsed. It was a further two months before she was admitted to hospital, by which time walking was impossible for her. Two years later, she still had a 'slow, stiff waddling gait.'

Some of the other women with prolonged high-level exposure to n-hexane have an even more devastating clinical history. Several have been quadraplegic for months; two others have been left with visual impairment; and one adolescent has experienced a general decline in initiative and intellectual ability.

Schaumberg warns that many of the major regulatory agencies are not even aware of the problem.

Nature, 20.7.78

How to Sell a Reactor

If anybody has a nuclear reactor they can't get rid of, they should hop on the nearest aeroplane and head straight for the Philippines. The ease with which Westinghouse, the giant US electric company, earned its contract in 1976 to build a nuclear power plant at Marong in Bataan Province should raise the hopes of downcast nuclear salesmen the world over.

* The contract was acquired through political corruption. Westinghouse simply agreed to give a helping hand (to the tune of $40 million) to Herminio Disini, a close relative of the wife of President Marcos, the Philippine dictator. Disini now owns Asia Industries, the principal sub-contractor, plus three other firms profiting from the deal.
* The plant is unrelated to local needs: the electricity will go to a nearby "free trade industrial zone" for export industry, seventy per cent of it foreign owned.
* So far as the Marcos regime was concerned, there was no need for Westinghouse officials to worry their heads about safety. The reactor site is nine miles from an active volcano, with three others within ninety miles. Six miles away lies the US naval base of Subic Bay, which stores vast stocks of diesel and jet fuel, ammunition, and military hardware.

Twenty-five thousand people signed a petition against the plant, but martial law under the Marcos regime prevents any effective opposition from being organised. Their only hope of halting construction lies in three separate investigations being carried out in the United States into the relationship between Westinghouse and Herminio Disini. If it is proved that bribery took place, then the original contract for the plant would be nullified and financial support for the project would be withdrawn by its chief backer, the US Export-Import Bank. The latter are also beginning to ask awkward questions about Westinghouse's estimates for the cost of construction; eighteen months ago they quoted a price of a mere 250 million dollars; today they are asking for 1.1 billion dollars. Nor do they seem to have much idea where the money has gone to. Perhaps the Export-Import Bank should direct its questions to Mr. Disini and other Philippine officials who have ensured that Westinghouse's tender was truly competitive.

Wise, No. 2
Far Eastern Economic Review, June 23 1978

Of Brothels, Fried Eggs and Ironing Boards . . .

Think what lack-lustre lives we would lead without scientists to probe the mysteries of the universe for us. In this modern, technological world we surely owe it to ourselves to keep abreast of the latest developments in scientific research. Below are some of the more exciting breakthroughs made in the last year:

* Dr. Pierre Van den Berghe and his partner Dr. George Primov have recently completed an extremely interesting study on "the social and behavioural relationships" in a Peruvian brothel. During eighteen months of fieldwork, they interviewed twenty-one prostitutes formally and "many more" informally. Their conclusion: the Peruvian brothel is "an important sexual dispensary and social arena". The study cost £52,000.
* The US National Science Foundation has already spent £42,000 trying to find out why people fall in love. So far they have had no positive results.
* The US Department of Agriculture is still wrestling with the problem of how long it takes to cook a breakfast of two fried eggs and toast. Once completed, the study will be of enormous benefit to the food industry in determining direct labour costs.
* The same department has also spent a worthwhile £57,000 researching into children's clothes. A major finding: mothers don't like ironing them.
* Finally, the US National Institute of Alcoholism is currently experimenting to find out if drunk fish are more aggressive than sober fish, and whether rats can be systematically turned into alcoholics.

Sunday Times, 23.4.78
US News and World Report, 18.9.78

Alternatives Favoured in Poll

Four out of five Americans favour a crash programme to develop solar energy, according to a recent Harris Poll. For the first time too, less than fifty per cent of Americans want to expand nuclear power, and the poll shows that, in general, environmental protection is rated higher than economic growth and job creation. Seventy-one per cent of those interviewed said that they would rather live in a clean environment than an area where jobs were plentiful. Sixty-five per cent opposed cutting back on water and air pollution control to get the economy going again.

Critical Mass, June 1978

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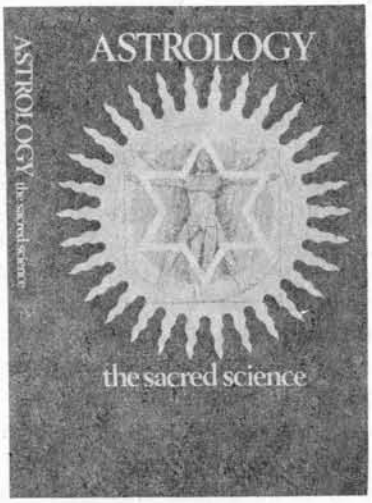

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Reconciling Man with the Environment

Lord Ashby

How should governments make the political decisions that are necessary to protect the environment? In this important new book Lord Ashby traces the political process between the disclosure of a hazard to the environment and the action to remedy it, and examines the evolution of the public conscience from indifference to concern. £4.25.

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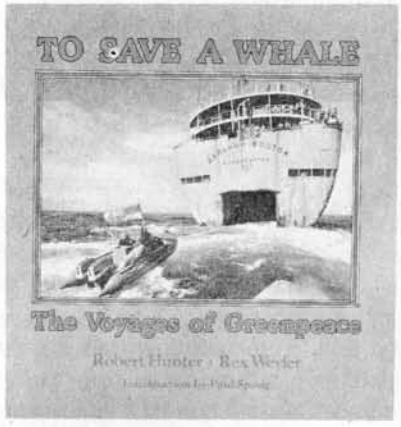

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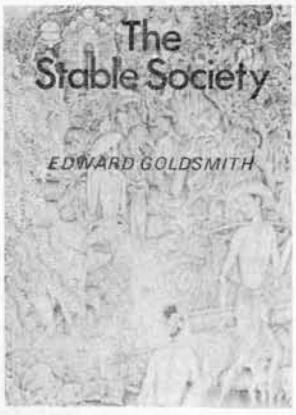

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Books

Hot reactions - cool reactors

NUCLEAR POWER: Its Development in the UK, R.F. Pocock, Unwin Bros.
NUCLEAR POWER AND THE ENERGY CRISIS, Duncan Burn, Macmillan 1978.
THE RISKS OF NUCLEAR POWER REACTORS: A Review of the NRC Reactor Safety Study, the Union of Concerned Scientists, Wash 1400, 1977.

In the long run the nuclear power industry will stand or fall on the respective viability or failure of its constituent processes. Any breakage in the link from uranium mining to the proper functioning of reprocessing plants and the entire operation is jeopardised. Breeder reactors thus make little sense without thermal reactors to supply them with plutonium and thermal reactors without reprocessing plants add up to a very limited programme of just a few years duration. The looming question — and it applies to practically every stage in the nuclear fuel cycle — is whether nuclear power can be operated both economically and safely.

Given the connection between all the parts it is hardly surprising that three rather disparate books on nuclear power should somehow provide the reader with a running theme which takes him first through the history — at least that part most applicable to Britain — into rank controversy involving economics and safety. Pocock's book makes an easy and pleasant read about the development of nuclear power in Britain. He explains why British scientists opted for gas-cooled reactors in the first commercial nuclear power programme, which began with Calder Hall in 1956, and why the Advanced Gas Reactors (AGRs) were a natural development from Magnox reactors. Indeed, after the war Britain was excluded, for security reasons, from participating in the American programme and consequently had to set about establishing its own research programme. For a country with relatively expensive coal compared with the US, but low capital charges, it made little sense to embark on the system favoured by the US — the pressurised vessel light water reactors — for that would have meant uranium enrichment and its heavy consumption of expensive electricity. As for the lower capital charges they meant that Britain could choose to build more costly reactors than the US. The AGRs of the second phase of reactor development admittedly used enriched fuel, but at Capenhurst the UK had developed its own enrichment industry. Because of their higher fuel burn up and the high temperatures reached, the AGRs can achieve thermal efficiencies approaching that of the most advanced fossil fuel power stations.

Given the logic of Britain's commitment to gas-cooled reactors Pocock makes it sound as if the decisions taken were the right ones and that upsets like the long delays in completing the AGR programme, or the fall in the growth rate of electricity consumption in the UK, could not have been foreseen and were not particularly the fault of the Atomic Energy Authority. He has some interesting figures concerning the cost of research and development of nuclear power in Britain and how royalties for that R and D were waived on the electricity board's magnox reactors and were instead given over to the tax-payer. He is also fairly open about the added cost to the country of the nuclear power programme during the 1950s and 60s, when the cost of fossil fuels was low; but for all that Pocock is a dedicated nuclear engineer and he believes that atomic energy has come into its own as the cheapest source of electricity in Britain, especially with the AGRs. As for those who would impute that because nuclear electricity in Britain is heavily subsidized it is given an unfair start in the competition for cheap electricity production, Pocock reminds us of the government's writing off of the NCB's £475 million debt in 1972.

Pocock's rather mild account of the development of nuclear power in Britain — something of a self-congratulatory exercise on behalf of the AEA — takes on a different perspective when seen against Duncan Burn's trenchant attack on the AEA for the way it has monopolised development and excluded fair competition among the consortia. According to Burn the later Magnox stations and the AGRs which followed them have been an unmitigated disaster. He gives a riveting and tightly documented account of how Sir Christopher Hinton's group at Risley dominated all decisions with regard to reactor development and imposed its own designs on the consortia and on electricity generating boards, without taking into consideration reactor development in the rest of the world, in particular in the United States where different manufacturers — Westinghouse and General Electric for example — had set about developing commercially viable reactors.

Burn is an unabashed enthusiast of the light water reactor and as much as he finds fault with the AGRs and their incredibly high cost he finds good things to say about the boiling water and pressurised vessel reactors — which are now dominating the world. It is no coincidence, says Burn, that the French abandoned further work with gas-cooled reactors and opted for the cheaper, less complicated LWR, or that the Germans and Japanese have all gone for the American type reactor. In common with Professor Henderson of University College and Colin Sweet, Burn finds that the AGRs have cost, to date, in the region of £3,000 million, some five times more than the original estimates and consequently he sees no way in which they can produce competitive electricity. Moreover the lengthy construction times are not just the fault of the consortia as the AEA has implied, but of the AEA itself which did not carry through, step by step scaling up from the small Windscale

AGR prototype, to the massive stations now in the process of completion. As for the consortia, they never had a chance in Britain since, unlike the Germans, they were restricted to reactor types developed by the AEA and forced upon them — through the equally bound electricity generating boards — by government. Free choice when attempted by Sir Arthur Hawkins, then CEGB Chairman, ended in furious government rows and his replacement by Tombs.

Burn is at pains to point out that the problems with nuclear power stations in the rest of the world, the United States, Japan, West Germany, for example, have nothing to do with the reactor types but with the environmentalists who have caused terrible delays through legal interventions and the like. He reckons that up to one third of the capital costs of a reactor are a result of environmental action bringing about delays in construction. With regard to the safety of light water reactors Burn has absolutely no qualms whatever, and to make his point he cites the much vaunted Rasmussen report which indicates a negligible risk from reactor accidents. Indeed Burn castigates environmentalists for being ignorant on such issues as safety and for not listening to their peers.

Having gone from praise of AGRs to their damnation and to the unassailable advantages of LWRs, we come now to a wholly new perspective of reactor safety from the Union of Concerned Scientists. Rasmussen and his team of researchers may have given LWRs a clean bill of health as far as Burn and other gullible aficionados of that reactor type are concerned, but they have failed to impress a body of scientists including top-ranking nuclear physicists, engineers, mathematicians and radiation biologists.

In their Reactor Safety Study, Rasmussen and his team conclude that the probability of an accident which would lead to a major dispersal of radioactivity which in turn would expose millions of citizens to an increased likelihood of cancer, is one chance in one billion per year of reactor operation. According to the final RSS report, the worst case of a 1000 megawatt reactor meltdown would result in 3,300 early fatalities, 45,000 cases of early illness and 14 billion dollars worth of property damage. Long term health effects from the same accident are estimated as 45,000 latent cancer fatalities, 240,000 thyroid nodules, and approximately 5,000 genetic effects in the first generation after the accident.

Those consequences may sound hideous and unacceptable but the chances are so small as to be in the realms of the never-never. However, despite three years' research and four million dollars expenditure, Rasmussen's safety research team has made some incredibly naive boobs which serve to underestimate by orders of magnitude, the potential risk from nuclear power.

Meltdown of the nuclear fuel in the reactor core is the single category of accident that can give rise to significant risk of radioactive release. Rasmussen concludes that the probability of such an accident is 1:20,000 per reactor year. According to the Union of Concerned Scientists Rasmussen's team has mistakenly used the median rather than the mean in 'log normal' distributions and so has underestimated the risk by 2.5 on that count alone. The Union also criticises the use of 'fault tree analysis' as a method for establishing the likelihood of component failure. Such a methodology was found wanting by NASA when applied to the firing of rockets; indeed the engine for the Apollo Service Module had its reliability predicted at one failure per ten thousand missions. After thousands of tests the highest reliability achieved was four failures per hundred missions. 'The RSS thus used an unconventional technically baseless statistical procedure for presenting its probability results — and one which involved a misleadingly sanguine picture of the chances of serious accidents' proclaims the Union of Concerned Scientists.

By the time the Union has gone through 'common-cause failures' in which arrays of equipment and back-up equipment are put out of action, such as happened at Browns Ferry when 1,600 cables were burnt out; unforeseen design failures including fracturing of the reactor vessel from over-pressurization; through the cancer and genetic consequences of a reactor accident in which radioactive substances are released; the chances and effects of a major reactor accident are seen to be not nearly as trivial as implied in the Reactor Safety Study.

The scientists conclude that 'after correction of a number of the most obvious RSS errors, the chance of melting accompanied by large radioactive release may be one in 10,000 per reactor year, twenty times greater than the RSS value. An upper limit for the chance of melting alone, based solely on the absence of a meltdown so far in the history of the nuclear programme, is one in 300 per reactor-year. 'As for prompt injuries and fatalities from nuclear accidents . . . the consequences could be 100 to 1,000 times greater than RSS estimates.' A main conclusion of the Union is that the risk of a major nuclear reactor accident combined with the possible short and long term fatalities, puts nuclear power on an equivalent footing with other major causes of death from accidents, such as air crashes or exploration, with up to one thousand fatalities, and then in a class all of its own as the fatalities go beyond the 10,000 mark.

Rasmussen considered only LWRs of the kind now in operation and only the first such 100 reactors. He did not consider breeder reactors or reactors larger than those now being used, consequently his study is limited to the current situation rather than to the future. Its serious limitations together with its gross underestimates of accident probability cannot reassure either those in favour of nuclear power or those who are dead against. The Union of Concerned Scientists has certainly done a service in exposing what is little more than an exercise in bamboozling the public, and Duncan Burn with it, into thinking that nuclear power is and always will be safe. Another link in the long chain of processes has been weakened. We must hope that nuclear power can be forestalled before there really is a major accident to prove right the worst prognosis of the Union.

Peter Bunyard

Small Comfort

RECONCILING MAN WITH THE ENVIRONMENT by Eric Ashby, O.U.P., £4.25.
MEASURING AND MONITORING THE ENVIRONMENT, edited by John Lenihan and William W. Fletcher, Blackie, £4.00.

Why are published lectures so often more readable than material produced specifically to be read? Perhaps the prospect of addressing a live audience compels us all to resist the temptation to waffle, and to express our thoughts as clearly and concisely as we can. *Reconciling Man with the Environment*, which consists of three lectures delivered by Eric Ashby at Stanford University last year, is no exception. You may not agree with all Lord Ashby has to say; but at least his views are lucidly and elegantly expressed. Briefly, his theme is that the environmental crisis is not, properly speaking, a crisis at all: it is rather a *permanent* change in the conditions of man's life on earth. We have got to learn to live with problems of population, resources and pollution for the rest of our history as a species.

Faced with this gloomy prospect Lord Ashby maintains a cautious optimism. He finds in recent years evidence of a growing respect for the natural ecosystem — not merely among professional environmentalists, but among decision-makers and the general public as well. A 'trend in social values from exploitation to symbiosis is actually occurring'. The bulk of the book is taken up with an examination of the processes by which public concern is aroused and transformed into political action. On the way there is useful discussion of such matters as cost-benefit analysis, the morality of shock tactics to excite the public conscience, and the extent to which the pronouncements of scientists and economists can achieve true objectivity (a *very* limited extent, Lord Ashby concludes).

Reading this book helped me to understand a number of problems better: but I am not entirely convinced by its central thesis. It is surely arguable that public concern with environmental matters grows in direct proportion to man's assaults on the environment — that it is a symptom of our malaise rather than an indication of a return to health. Lord Ashby quotes the standard examples of recent advances — the increased purity of London's air and the Thames's water, for instance. But every reader of this magazine could probably cite twenty minuses for every plus in the environmental record of the past thirty years. I wish I could believe that the reasonable, moderate, sensible approach is the right one.

The five contributors to *Measuring and Monitoring the Environment* deal with biological indicators, the analysis of food, water quality control, human hair as a recorder of chemical pollution, and adverse reactions to therapeutic drugs. The last item exemplifies the complexities of the situation we have got ourselves into. No drug can ever be described as 'safe' without qualification: if it is not inherently toxic, genetic or other factors may make it so for a particular patient — one instance quoted here is of the 10,000 odd descendants of a 17th century Dutch couple in South Africa, all of whom unwittingly inherited an acute sensitivity to barbiturates. Again, many chemicals individually safe interact with one another to form lethal combinations: logically, no new drug should be pronounced safe until it has been tested in every possible combination with all the thousands of existing drugs. The same, presumably, goes for pollutants in the environment. There must come a point — probably it has come already — when all the scientists in the world would be insufficient to carry out the multiplicity of tests needed to guarantee the safety of one new chemical. Lord Ashby would retort that the really appalling risks tend to be identified and counteracted fairly quickly. This may be true, though it can be little comfort to the victims of Minamata or thalidomide: but perhaps a more serious long-term danger is the insidious accumulation of innumerable small hazards. They may not finish us off: but I find almost equally depressing the prospect of mankind acquiescing in a progressive deterioration of the ecosystem. To give Eric Ashby the last word, "it is one consequence of the astonishing adaptability of man that he has to be persuaded to be dissatisfied about abuses to his environment".

Nicholas Gould

Needs must

THE LIMITS OF SATISFACTION by William Leiss, Marion Boyars, £2.25

O reason not the need: our basest
beggars
Are in the poorest thing superfluous.

Thus Lear to his ungrateful daughters. According to William Shakespeare man always wants more than he needs, but according to William Leiss he only wants it because of the 'high-intensity market setting'. My vote goes to the bard. Greeks and Romans, Borgias and Bourbons over-consumed to the extent of their means; upper and upper-middle class Victorians usually had more possessions — including an almost forgotten labour-saving device which they called the servant — than any affluent westerner today. The high-intensity market setting is more an effect than a cause of our craving for superfluity.

What's new and disastrous is that there are now so many relatively rich people in the industrialised world. Instead of 5 per cent or 10 per cent many countries have 50 per cent to 90 per cent who can afford to over-indulge, and in most cases that's 50 per cent to 90 per cent of a greatly expanded population. The resulting ecological threat is well known to readers of this magazine.

The Limits to Satisfaction is an academic critique of our industrial society. Professor Leiss demonstrates that growth can only be maintained if human wants — never fully satisfied — escalate continuously. Similarly he shows the fallacy of assuming that happiness depends on a steady rise in GNP, and the folly of relying on some future 'technological fix' to save us, or our grandchildren, from the consequences of resource misuse. John Stuart Mill, first advocate of the stationary society, is his hero. Mine too, and perhaps yours. Despite its analytical approach, however, this book adds little to our understanding of present dangers and offers no solutions.

Confused, it would seem, by his own jargon and misled by his logic, Leiss claims that commodities have

become functionless assemblages of subjectively applied characteristics. Yet refrigerators do refrigerate, dishwashers do wash dishes (albeit badly) and, like very many other modern products, they are bought primarily for what they do. Leiss exaggerates their symbolical role into realms of fantasy.

The pervasiveness of the high-intensity market setting and the power of the marketeers are also overrated in *The Limits to Satisfaction*. No reference is made to the unprecedented volume of artistic activity in our age, nor to the ever-growing compassion industry, and certainly not to the fact that business is more restricted by legislation than ever before. Instead he sees us all as captive consumers hypnotised by the market and the media. In practice, of course, there is a roughly constant balance between propaganda and credibility. The youth who has sat through 1000 hours of commercials is no more gullible and no less sceptical than the youth who has sat through 1000 hours of sermons.

Yet Leiss must be right in thinking that the planet cannot sustain an ever-escalating material standard of living for an ever-escalating population. The choice is stark but simple: we must curb either man's greed or his numbers.

Victor Gordon

A Nose for Pollution

THE SOCIAL AUDIT POLLUTION HANDBOOK: HOW TO ASSESS ENVIRONMENTAL WORKPLACE POLLUTION, Maurice Frankel, Macmillan, £10.00, Paperback £3.95.

The Social Audit Pollution Handbook aims to help workers and members of the public learn more about toxic hazards inside factories, in the air, in rivers, and in drinking water. Maurice Frankel explains how one can search for and interpret information on pollution, and how to use this for the purpose of ensuring adequate protection. The first section deals with the harmful effects of toxic hazards, and the final two sections deal with the specific problems of air and water pollution. With this book the reader should be able to discover the known dangers of pollutants. It is perhaps no surprise to hear that very little is known about the dangers of a great number of common chemicals handled at work and also discharged as waste into the environment. The final chapter is particularly interesting as it explains how one can set up a 'Pollution Audit' of a firm. The 'Audit' is based upon a simple questionnaire designed to assess how effectively a firm protects its workforce and the surrounding community from toxic substances.

The main limitations of the book are first that it is almost totally concerned with dangers to health rather than with more general ecological effects or damage to property and agriculture. Secondly, although the reader is told how to find out information about pollution hazards, much less is said about how to make use of this to advantage. For though Frankel's book is written for the layman, he assumes a good deal of knowledge about the planning system and the problems facing those responsible for pollution control. Finally some readers might find it difficult to sort out the more general and digestible advice from the detailed technical information. Nevertheless, although this is not a comprehensive handbook, it is a major contribution and should be widely read by those who want to know more about the pollution hazards of their environment.

Francis Sandbach

Uncomfortable Truths

THE SEVENTH ENEMY: THE HUMAN FACTOR IN THE GLOBAL CRISIS, by Ronald Higgins, Hodder & Stoughton, £5.95.

In *The Seventh Enemy*, Ronald Higgins draws attention to an uncomfortable truth: that a world facing multiple crisis — overpopulation, famine, resource depletion, ecological calamity, nuclear disaster — is also a world in which governments pursue policies of undaunted irrelevance, with no conception of long-term planning that extends much beyond five years. The subject of this book — the seventh enemy of the title — is political intertia and, what permits and sustains that inertia, the short-sightedness of individuals as elected and electors.

Ronald Higgins has experience of the untidy realities of political decision-making, both in the Foreign Office, where he encountered the philosophy of 'masterly inaction', and as personal assistant to Edward Heath in the early 1960s, and it might be expected that his proposals for rendering ecologically and socially desirable ends into politically practicable policies would be more interesting than his analysis of the trends that are leading towards disruption. This analysis, which occupies the first half of the book, covers the ground thoroughly, but none of the ground is new. Sadly, the same might almost be said of the second half. Having been introduced at the outset to the perspective of the Resident Clerk on duty through the night at the Foreign Office, a perspective that is circumscribed by the need for immediate effective information, the reader might be at least a little surprised to learn at the conclusion that the ultimate remedy for the global crisis lies in a reawakening of love and religious consciousness within the human individual; *The Daily Telegraph* gives way to *Resurgence*.

Mr. Higgins is pessimistic about the likelihood of avoiding disaster; he develops, in the course of two chapters, a scenario for the next twenty-five years that includes nuclear terrorism, mounting international conflict over scarce resources, increasingly authoritarian governments, and a general decline in the life-support capacity of the planet. It is among his main points that the fear that must arise out of informed awareness of the global situation is a healthy response.

It seems quite possible that this will be an important book, not for its content but for the readership that it may command: while the ecological movement will find little that is new here (though much that is sound), the same is not true of those outside the movement. If *The Seventh Enemy* can increase awareness of what is going to happen, and why, then it deserves a hearty welcome.

Bernard Gilbert

Rushing to a Chill Tomorrow

THE REAL WEALTH OF NATIONS, S.R. Eyre, Arnold 1978, £7.95. CONSERVATION AND ECONOMIC EFFICIENCY, T. Page, Johns Hopkins UP £11.25.

Coming shortly after Malcolm Caldwell's re-analysis of Adam Smith (*The Wealth of Some Nations* Zed Press) Eyre's book treads a parallel path and even arrives at broadly similar conclusions, but uses very different analyses. Dr. Eyre is well known to generations of economists and geographers, and the near-stridency of this book may be a shade disconcerting for those safely cocooned, but not wealthily, from the real world in their cosy academic niches.

However, this is all the more reason to recommend this book. By using absolutely conventional data on primary plant productivity, and then refining this with reference to the merciless catalogue of erosion, salination, deforestation, climate modification — ad nauseum — he is able to show the already very wide gap between the potential of global plant production versus the probable yield at present. With every justification, he presents arguments to support his view that this total will shrink even further by early next century. Eyre then dramatises this analysis by relating the potential (or 'pre-civilization') maximum plant productivity to individual areas and populations of the world's nations today. Europe in general, and a string of ultra-poor ex-colonies (for example Jamaica, Haiti, Bangladesh, Egypt, India,) come lowest. Of the very few rich nations by Eyre's analysis, Angola and Zaire are among the largest — which may help to explain the scramble by Europe to save these nations as a source of food and minerals.

After very successfully using this analytical approach in a broad-brush manner to add depth to resource geopolitics, he goes on to look at the UK in depth. He reveals a real high-latitude Bangladesh, physically incapable of feeding its population, let alone supplying their tea, coffee, shoe leather, timber and vegetable or other oils — in fact almost anything but pig meat, potatoes and some grains, the subsistence food economy of the period up to the Industrial Revolution. The tight rope of 'progress', courtesy of colonial and postcolonial access to the organic resources of the world, is stretched above a vast chasm. Without cheap energy and international trade as it is presently constituted, we are finished.

Eyre might of course disagree with this kind of conclusion, but in his sections on energy (where he tends to rely only on the say-so of Amory Lovins) and minerals the conclusion of just how precarious and unsustainable the European and even US position is can be clearly detected between the lines. While a Wilfred Beckerman would soon have the whole book dismissed as alarmist rubbish, and — unfortunately — some environmental groups and spokespeople would also denigrate its outspokeness in their craven desire to be 'reasonable', no sane person with any knowledge of climate, soils and economic geography could dismiss his first and longest sections out of hand.

Talbot Page's book, with its by-line 'Produced for Resources for the Future' might initially trigger off some resignations. After all, RFF put its big feet in it when — in the rosy and long dead 1960s — it forecast limitless energy and minerals reserves for 'The Future' (of America). This has been explained by many as due to having the same funding sources as Britain's rave intellectual journal '*Encounter*. However, the book is in fact a useful, if very dry and extremely expensive, look at the bases to materials use and exploitation policies. Wilfred Beckerman would be very much at home with this book, in its reviews on 'Intertemporal Equity', and so forth, but beneath the econo-jargon there are some neatly presented conclusions on the present workings of Adam Smith's invisible hand (and Herman Daly's invisible foot) that would leave poor Wilfred a little frothy around the mouth. For example Page thoroughly analyses that very important and little understood mechanism — the discounting system. A high rate of discount, such as a present value or time preference rate of discount he describes as a method for living 'somewhat better in the beginning at the cost of an earlier death'. And by using a high discount rate on the depletion of 'hardtack resources' (depletable resources) a Robinson Crusoe abandoned on Spaceship Earth 'essentially decides to commit suicide in order to live better in the present'. 'The moral problem can be still worse' Page continues. 'Suppose that instead of deciding only for his own life, Crusoe must decide for others . . . Suppose . . . his band, Tahitian wives and all, were thrown up on a barren island with a huge stock of hardtack, sufficient for several generations, and with no means of escape. Then the first generations are forced . . . (to decide) . . . which generation will be the last one'. As he points out, this is a cast iron process for generating inter-generational conflict, because 'as you grow up, it is explained to you that the world is going to end very shortly because earlier generations wanted to live well'.

Today we have exactly this situation: tomorrow there will be no oil, no gas, thousands of square miles more desert and less forest, minerals cast, literally, upon the seas into ultimate dilution, and two billion more mouths to feed by year 2000. The reason, explained to us by our leaders and their fast mouthed economists, is to safeguard and increase *today's* standards of living. Tomorrow, electorally and morally, is a very long way off. Explaining that to millions more unemployed in the West, and young people cheated out of their land, culture and any real life in the Third World is going to be difficult — especially because of the $400 Billion-worth of weapons being pumped out yearly (to support Baptist Carter and Communist Brezhnev doctrines), that will still be around, and very lethal, by late this century. This book, then, broaches subjects as important as these in the peculiar language of theoretical economics. For those who get their hardtack that way it is no doubt a useful work, we could certainly hope our own economic gurus might take a look.

Andrew MacKillop

Another curate's egg

EATING FOR HEALTH, edited by Health Depts. of Great Britain and Northern Ireland (HMSO, 95p 81pp. 1978).

This is the third of a series of papers published by HMSO with the idea of promoting an increase in the knowledge and use of preventive medicine. Its expressed purpose is to set out what is known about food in relation to the human body, as the title indicates. However, it makes disappointing reading. Apart from not being scientific enough to hold the attention of an expert in nutrition while being too heavy going for the average housewife, it suffers from other defects which are more serious.

On the whole, the booklet gives the impression of having been written by people who cannot make up their minds about certain elements of nutrition, or who are afraid to commit themselves, possibly because they do not wish to offend Vested Interests in the food industry. This can be seen clearly in the sections dealing with the refined carbohydrates. While sugar is rightly condemned as the sole cause of many diseases, bread (and white flour in general) does not suffer in the same way.

We are told that the present extraction rate of our flour removes certain nutrient elements from it, but we are then told not to worry, because those nutrients can easily be obtained from other foods! Surely, that is not the point at issue. The question is whether this staple factor in our daily diet is harmful or not, especially with regard to the extraction of the natural fibre and vitamins. No mention is made of other additives to flour except chalk, or of the baking processes which make our British loaf the worst in the world. It is significant that cereal germ-oil, especially that of maize, is an important prevention against peridontal diseases, among others. This is removed from white flour and cannot be replaced by any artificial means. In any case, it is highly doubtful whether synthetic vitamins are as valuable as natural ones.

One can only hope that the new Government Commission set up to examine the whole question of fibre in diet will have the courage to advise that the fibre in flour and bread should be assured by means of an 85-90% extraction, and that their findings will meet with greater success than those of former Commissions on this subject.

Some statements in the booklet could be questioned; for example, that 'convenience' or processed foods are as good as, if not better than, fresh foods, or that saccharin is harmless, in spite of its crude-oil origin. The impression is given that we in Britain eat well and that malnutrition has been practically eliminated from our community, mainly due to the improved food technology used. This depends entirely on what one means by *nutrition*. If the word means that most people have got enough to eat to prevent the pangs of hunger then it may be true; but if it means that everyone is eating really nourishing foods, then it is not true. Hospitals all over the so-called civilized world are now coming up against cases of malnutrition, due mainly to the consumption of 'package' meals. In geriatric medicine this is one of the first things one suspects in many diseases.

However, some sections of the booklet are excellent, for example, that on breast feeding, the dangers of white sugar and the importance of a balanced diet with plenty of fibre. One of the main functions of fibre is its action similar to that of the old-fashioned chimney sweeper's brush! It prevents the accumulation on the intestinal walls of food residues which can build up there a focus of fermentation, suitable only as a breeding ground for pathological bacteria and a possible cause of bowel diseases.

Some of the disappointing elements in this booklet can be found in the fact that it includes so much which could have been left out and omits so much which could have been invaluable in attaining its expressed purpose. It hints that additives in processed foods are necessary and harmless; but no mention is made of the dangers to health of certain hormones administered to animals destined for human consumption to increase their weight rapidly for market.

The Bibliography is adequate for further reading, but it is a pity there is no mention of *Just Consequences*, edited by John Waller, or of the works of Kenneth Barlow or Ross Hume Hall — a *must* in nutritional science at the moment.

David L. Greenstock

Authors in this issue

Lorna Salzman
lives in New York and has for many years been mid-Atlantic representative for Friends of the Earth, U.S.A. She is well known in environmental circles for her tireless work on behalf of the anti-nuclear lobby.

Peter Barnes
is the West Coast editor of *The New Republic*. He describes himself as a city-based journalist, but his concern for the future of America's agricultural land will wake echoes in the hearts of all country-bred people.

Colin Hines
is a researcher with Earth Resources Research in London. He is at present working on a study of the employment potential that would result from the utilization of Britain's derelict land resources. The report entitled *Gaining Ground* will be published in 1979. The article we publish in this issue is an updated version of a report produced for ERR earlier this year.

Peter Barry Chowka
is a freelance journalist and photographer from Massachusetts with a special interest in the field of alternative medicine. His work has appeared in journals in America, Australia and Europe.

OTHER BOOKS RECEIVED

The One-Straw Revolution: An introduction to natural farming by Masanobu Fukuoka, Rodale Press £4.75.

The author is Japan's best known 'natural' farmer; he is also a philosopher for whom working on the land is a total fulfilment. In his book he describes both his methods of farming the land where his family have probably lived for over a thousand years, and the philosophical impulse that informs all that he does. The fundamental relationships between man and the natural world may be illustrated by reference to rice growing, but they are just as applicable to growing crops in any other situation.

Gardeners Delight by John Seymour. Michael Joseph £2.95.

This little book must rate as the ultimate in inexpensive presents for gardeners and gourmets alike. Elegant illustrations by Peter Morer accompany the witty, pretty, medical, culinary, ancient, modern and instructive texts. "Cabbage is extremely windy . . . as windy as can be eaten, unless you eat Bagpipes or Bellows."

Healing Plants. A Modern Herbal. Edited by William A.R. Thompson M.D., Macmillan £9.95.

The resurgence of interest in natural medicine and herbal remedies may prove of vital importance in the post-industrial world: this comprehensive book, with contributions from doctors, botanists, pharmacologists and others can therefore be recommended both as a pleasure to browse in and as a *vade mecum* for that growing number of people who increasingly distrust modern chemical drugs. The first part of the book describes and illustrates 240 herbs and flowers whose healing properties have been known for centuries, and gives practical advice on where to find them and how to harvest and prepare them. In the second half the various ailments that may be treated by them are listed together with instructions as to application and dose.

Worldwide Loss of Cropland. Lester Brown, Worldwatch Paper 24 $2.00. Available from Wadebridge Press, 73 Molesworth St., Wadebridge, Cornwall, £1.00 including postage.

The latest Worldwatch paper concerns a global problem of enormous significance. Expanding cities will have covered another twenty-five million hectares of cropland by the year 2000. More will be lost to transport while modern farming techniques are eroding the natural fertility of agricultural land throughout the world. A mammoth effort through land-use legislation is required to protect cropland from further loss, and to halt the desertification of more arable land through overgrazing and other malpractices; concurrently more must be done to reduce population and thereby the increasing requirement for food and fuel.

Living Without Cruelty — Labour's Charter for Animal Protection. From Transport House, Smith Square. Price 45p.

"In 1976 some 5½ million living animals were used in experiments . . . the law controlling such experiments dates back to 1876. It has never been amended and is out of date. Its enforcement is often grotesquely inadequate." Thus saith the Labour Party and thus reiterates its statement in this policy document, which outlines plans to alleviate the sufferings of animals used in medical research, animals abused in factory farming, animals hunted and snared; animals exported alive for slaughtering on the continent; animals callously treated in badly run zoos and domestic pets kept in environments that cause them suffering. Everyone concerned for the welfare of these creatures should have a copy at hand and should take every opportunity to remind MPs, of whatever persuasion, that millions more will suffer and die until policy and promises become law. On this obviously non-party issue Labour have, to their credit, taken one step in the right direction; it must not be allowed to become a footprint in the sand.

Recycling. An Interdisciplinary Approach to Environmental Education. Rodale Press £1.50.

Inspite of the rather longwinded title this large American paperback is designed to teach schoolchildren why conservation is necessary and to inculcate in them the old fashioned virtue of thrift. The greater part of the book shows ways in which many everyday objects can be recycled. Not everyone's cup of tea but useful as a source of ideas for teachers faced with the task of kindling enthusiasm for conservation projects in schools.

An Introduction to Population Ecology. G. Evelyn Hutchinson. Yale University Press. No price given.

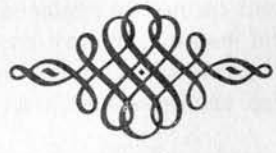
Strictly speaking a text for American University students this is an engagingly written book. I particularly enjoyed: ". . . a very important study of the African buffalo has appeared. The survivorship and relative morality (sic) curves are comparable to those of the Dall sheep."

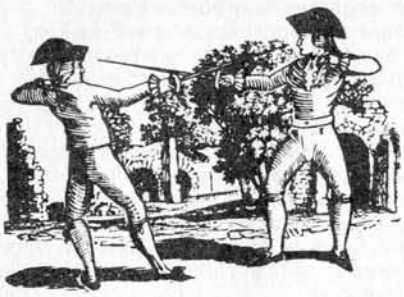
Problems of Ecology. M.K. Sands, Mills and Boon. Teachers edition £2.25. Students edition £1.75. Both paperback.

Like the last two books reviewed this is designed to introduce students, in this case those studying for an A level in the vast subject of Ecology, to environmental sciences. Deciding what to include and what to leave out must therefore have been to some extent governed by the information that examination boards will expect students to have absorbed. The author has wisely emphasised the necessity of teaching the student to solve some problems by observation and common sense rather than by referring to facts learned by rote. Nevertheless one is left with a feeling that as *Ecology* becomes a syllabus subject it will also cease to have any meaning, in its true sense, and the application of ecological principles will gain few recruits from this new school subject.

Looking at Place Names. Nicholas Gould. Published by Kenneth Mason, Homewell, Havant, Hampshire. £3.00. (add 18p postage)

A vast amount of work has obviously gone into Nicholas Gould's scholarly and informative book. It should have been more generously produced; the small print and thin paper do nothing to enhance it. None the less it is a must for anyone interested in the origins of place names in Britain; it contains information of exactly the kind to heighten one's awareness of the past as one travels through the land; recommended as a book for the car or the rucksack, or to browse through on a lazy winter's evening.





Letters

Freezing in blinkers

Dear Sir,

I hope Mr. Robert Waller and your other anti-nuclear correspondents will not compromise their anti-nuclear principles by using electric light, electric fires, cookers and fridges, or watch TV, since more than ten per cent of our electricity is now generated in nuclear power stations. Further, since Mr. Waller dismisses the value of professional qualifications, I hope that when he is next in hospital he will refuse to be examined or operated on by qualified medical practitioners, and will be just as happy to have the hospital porter operate on him.

Mr. Waller admires the vision of a scientist like Ivan Tolstoy; does he know that under cross examination he said he was only an 'informed amateur' in the subject of radiobiology and admitted freely that most of his submission was adduced from information already given at the Inquiry? Although a major part of his submission was concerned with the effect of earthquakes on buried waste, he was forced to admit that he could not conceive of an earthquake that could cause waste, in a burial deposit 600 metres deep, to be thrown to the surface of the earth.

Following a lengthy debate between himself and Sir Edward Pochin, who is a real expert, on the relative toxicity of Plutonium and Radium, it became apparent that certain basic calculations of Tolstoy's were at fault. Mr. Waller may think such a performance worthy of his admiration; I do not.

The Energy Crisis consists of the fact that on a timescale of decades, we are running out of our commonest fuel, oil, at a time when other limits, on metallic ore deposits, on freshwater supplies, and the need of the Third World countries to develop, mean we need more energy than ever before. I am just as concerned for the future of mankind as Mr. Waller, but unlike him I see nuclear energy as playing a substantial role in that future.

Without nuclear power we shall simply 'freeze in the dark'. Consequently I see Mr. Waller and his friends as the ones lacking intelligence and imagination.

Finally when referring to myself Mr. Waller got my name, my status, and my Establishment wrong, although they were clearly and correctly stated in my original letter. Perhaps this is indicative of his whole attitude towards factual matters in general.

Yours sincerely,
A.N. Buckler,
Weymouth, Dorset.

Fenitrothian is "approved" in Scotland

Dear Sir,

Your July/ August issue contained an article 'Canada's Moth War'. To this article you added a Stop Press announcement about the aerial application of an insecticide by the Forestry Commission. I take exception to the misleading sweeping statement you used: 'The chemical they will use is the deadly Fenitrothion, which, as the article shows, has been totally discredited in parallel circumstances in Canada'.

The article shows nothing of the kind. After devoting much space to claims linking the chemical Fenitrothion with the disease, Reye's Syndrome, the writer states: 'His (Crocker's) research indicated that the link was not the insecticide itself but the petro-chemical emulsifier used to disperse the insecticide.'

The formulation used by the Forestry Commission did not contain oil as an emulsifier but a glycol which is a specific chemical compound and not the 'crude gibgash' allegedly used in Canada.

In addition Fenitrothion is not deadly. It is registered in the 1978 Approved Products for Farmers and Growers under the Agricultural Chemicals Approvals Scheme for use with a variety of food crops.

Before the British operation received the necessary clearance for use in forestry, all aspects were subject to close scrutiny, under the terms of the Pesticides Safety Precautions Scheme, by the Advisory Committee on Pesticides which gave a very high degree of assurance on the safety of its use. The Forestry Commission also welcomed the condition that the entire spraying operation should be extensively monitored by the appropriate bodies, including a survey of birds, fish and other wildlife, for any circumstances which could affect future use of Fenitrothion in this country. As soon as results from the various monitoring bodies are known the Forestry Commission will publish a comprehensive report on their findings.

Yours faithfully,
G.G. Stewart
Commissioner, Forest and Estate Management, Forestry Commission, 231 Corstorphine Road, Edinburgh

Sold down the river

Dear Sir,

So much has been written on the disastrous flooding of the Bhagirathi river that I have not felt it necessary to encroach on your space, but the recent announcement of the U.P. (Utah Pradesh) Government that auctions of forest plots would take place on September 17th and 18th in Kotuwara and on the 22nd and 23rd in Narendranager have provoked me to take up my pen.

It surpasses imagination that during the course of such a disaster the U.P. authorities should publicly declare their continuation of the policy of 'scientific felling' (i.e.: destruction) of the Himalayan forest.

We have lost seven million hectares of fertile land to salinization and water logging. Erosion displaces six million tons of top soil annually. Surely the arithmetic of the situation would be obvious to a primary school student. But there seems to be a conspiracy of silence between the U.P. Government and the forest contractors to continue this criminal looting of precious natural resources, and thus to deprive future generations of any hope of survival. Apart from the financial loss and ecological damage, what about the condition of the thousands of families deprived of their family homes and ancestral lands, not to mention the psychological disturbance of mass-scale displacement? Such displacement lies at the root of the increase in alcoholism, drug addiction, gangsterism and crime that is now swamping our country.

It is sincerely to be hoped that the general public will organise mass peaceful demonstrations against the forest auctions. Furthermore, in view of the lessons of history which we have in many parts of the world, notably in the Sahara, which was once a fertile and well forested area, the Chinese hills and the Gobi desert, such a protest should not be limited to the people of India, but should be taken up by the rest of the world. For it is only through an international global policy for the conservation of the world's forests that we can hope to achieve future ecological stability.

Yours faithfully,
Sarala Devi
Dharamgarh, Berinag.

LETTERS contd.

APOLOGY

The editors would like to point out that the article, *Japan's Civil War* (July/August), was in no way meant to imply that the Narita Anti-airport League was dominated, or in any way influenced, by the Japanese Red Army. We would like to apologise if such an impression was given.

A great octogenarian

Dear Sir,

Article K from the Code of Practice of the Scott Bader Commonwealth Constitution [obtainable from Scott Bader Commonwealth, Wollaston, Wellingborough, Northants] reads: 'We are agreed that our social responsibility extends to 1: Limiting the products of our labour to those beneficial towards the community, in particular excluding any products for the specific purpose of manufacturing weapons of war. 2 Reducing any harmful effect of our work on the natural environment by rigorously avoiding the negligent discharge of pollutants. 3 Questioning constantly whether any of our activities are unnecessarily wasteful of the earth's natural resources.' The whole code, and the Preamble, approved by the whole membership — that is, the majority of the 400 co-workers — is a remarkable document providing a precise statement of 'the goals of economic activity', and putting that activity itself in its place. It embodies the philosophy of its founder, pointing alternative aims and foundations for the economy in place of the terrible twins of laissez-faire and State planning. And the Scott Bader Company itself is as remarkably successful, in innovation, profitability — and happiness. Fred Blum's exhaustive study, Work and Community *[Routledge, 1968], and subsequent reports by a team from the Cranfield Institute, supply convincing — and critical — evidence.*

Susanna Hoe's biography of the founder, Ernest Bader, as reviewed in The New Ecologist *' [July/ August 1978], will damage the reputation both of the man and of his achievement, if it implies that the Commonwealth is anything but the realisation of a long and deep commitment to Christian Pacifist ideals. 'Here is a man', writes Schumacher, in his Preface to the book, 'who incessantly asks himself 'Am I realising that which I consider to be the highest in life?'; who finds the answer, all too often, is No; and who then upsets everybody around him by insisting on a change of course. I have not met many people in my life who accepted the Christian idea of goodness not merely as an aspiration but as a responsibility and obligation the way Ernest Bader has done.' That estimate is hard to reconcile with the 'monster . . . a Christian of sorts . . . a disastrous employer' of the review.*

Pulling down great men does make a reputation, of sorts. People have done it to Robert Owen, Tolstoy, D.H. Lawrence, Gandhi — and they could easily compile a book of amusing and nasty anecdotes about you and me if we were worth it. Those are the things people remember, exaggerate, distort — even invent. What matters about Bader and his work is piercingly revealed by Schumacher, who wrote nothing better than his introduction to this life of a great, shocking octogenarian — who is no more an 'enigma' than anyone human.

Yours faithfully,
Charles Davey,
Bromsgrove School, Worcestershire.

A cup of comfort

Dear Sir,

Re the warning about comfrey issued by the H.D.R.A. in your No. 5 issue, you can count on me in with the late Vernon Stephenson's horses! I have been using comfrey since Mr. Hills wrote his first book on Comfrey in 1948 or '49.

We always tear up and place a leaf of comfrey in the teapot together with the ordinary Indian tea. At seven cups a day that makes a total of 76,650 cups! I suffer from emphysema but that cannot be attributed to comfrey. Otherwise I feel fine and at seventy-nine am still pursuing my hobbies of gardening and woodwork. Have just set up three solar panels on the roof together with the requisite electronics and plumbing. In the summer when the comfrey is tender I like to eat it like lettuce or in a bread and butter sandwich.

Yours faithfully,
Bill Anderson,
Bodorgan, Gwynedd.

On casting the first stone

Dear Editor,

It may be true that all movements initiating changes in society start out as movements of protest against the existing order. As they pass into their constructive phase, however, they are bound to put forward notions that are energising and optimistic. Nobody advanced into battle under a banner proclaiming "All is lost!" It might be well to examine our overt and covert leading ideas in this respect. The Eco discussion-documents "The Reckoning" and "After Affluence" could especially bear scrutiny in order to make sure action in a positive direction is called for.

We have rightly warned people that the kind of expansive attitudes that were tolerable in smaller communities than our contemporary ones become intolerable when elbow-room and resources begin to run out and populations are still expanding.

Before condemning other individuals or movements for selfishness, however, it is well to consider whether the ethical choices before all people are very different from what they have always been. For millions of people excessive self-seeking has always had destructive effects upon the masses of their neighbours or upon other societies.

Nine tenths of our human story may have been that of stable societies in tribal conditions and only one tenth that of the score of great civilisations which have risen, flourished, declined and disintegrated. For good and for ill Western society is penetrating to the far niches and habitats of the planet.

We may legitimately take action to mitigate its excesses as it extends the waves of change to remote Papuan longhouses or Hebridean crofts. Or we may take to smallholdings ourselves and have as little to do with it as we can (except for Black and Decker tools, local library books and a sophisticated typewriter).

What we can hardly do with consistency is reject all the traditions and experiences of the twenty odd civilisations. We have ridden on the backs of the tiger of change and cannot be the same as we were, even if we seek to act as midwives of a new social order based on low inputs, slow throughputs and minimum pollution.

Whilever we are using systems-approaches, anthropology, steel tools, printing and the bicycle we are still children of the twentieth century and cannot gird in a certain carping way at the other children of the times.

Personally I would say that the greatest discovery of the twenty odd civilisations was that of the religions of love and compassion, but I am no theologian. While a political party or pressure group may go some way towards putting spiritual aims on its programme in a non-mandatory form, it cannot and probably should not develop into a religious crusade.

Nonetheless the ecology movement, working within these constraints, has the chance to strike a new attitude in politics deriving much of its strength from the above religions. It can condemn the policies of growthmania and squandermania while recognising the common humanity with ourselves of the squanderers. It would be a pity to relapse thus early into the casting of first stones and the fatal cry of "seek out the traitors!"

Yours truly,
Ron Spathaky,
Secretary, Norwich Ecology Party,
31 Meadow Rise Road,
Norwich NR2 3QE.

Request

Dear Sir,

I am researching customs and traditions of Buckinghamshire and write to ask that if any of your readers have any knowledge or recollections of these would they please contact me.

Also should any readers have any curios, souvenirs, photographs, etc., connected with this subject which they are prepared to allow me to copy [at my expense] would they please contact me.

All replies will be acknowledged.

Yours faithfully,
Roy Trowbridge
18 Upland Avenue, Chesham,
Buckinghamshire.

Classified

SOUTH PLACE ETHICAL SOCIETY
Conway Hall, Red Lion Square,
London W.C.1.

Tuesday, December 19th, 7 p.m.

EXPERTS and PUBLIC INQUIRIES
How they can go wrong.

Speaker: Dr. Ralph W. King.

PERSONAL

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SITUATIONS WANTED

STUDENT (21) studying practical conservation seeks work on reserve to gain experience, preferably from Christmas 1978 for one year. R. Thorpe, 61 Hampton Road, Forest Gate, London E.7.

BOOKS & PUBLICATIONS

THE COMING AGE: the magazine of the primordial religion of the one Goddess. A faith in tune with nature, opposed to patriarchal urbanism/rationalism. 35p. 40, St. John St., Oxford.

SEND FOR LIST. Books, lessons giving you answers to all your questions. Use your own intelligence. Power Publishing (U.K.) Ltd., Brockwell Cottage, Sowerby Bridge, West Yorkshire.

MISCELLANEOUS

EXMOOR is a vital part of our national heritage of wild life and fine landscape. It is also one of the smallest National Parks and very vulnerable to agricultural development. Only about one fifth of the moor remains unploughed and unfenced; and we are doing our utmost to conserve it. Please give us your support. Annual subscription, only £2.50. Information from: The Exmoor Society, Parish Rooms, Dulverton, Somerset.

CUDDLY WHALE KIT — Felt, pattern, easy sewing instructions for 50cm whale, plus colourful SAVE THE WHALE poster, badge and information about whales. Send £2.50 and 20p p & p to: Friends of the Earth, 54-57 Allison Street, Birmingham 5.

GRAIN — Gay Rural Aid and Information Network. We believe in a more self-sufficient life-style with social and legal equality for all people. Bi-monthly newsletter and further details from: Grain, c/o 50 Riverview Grove, Chiswick, London W4 3QP. Please enclose large SAE.

CONSULT US on your industrial hazard problems. Ralph King Consultancy Services, 42 Reigate Road, Ewell, Surrey, KT17 1PX.

BIJA PRESS prints New Age Work exclusively. We are cheap, quick and good. We use recycled papers (will also supply same unprinted, cut to size at cost). If you consider that we can help write to: BIJA Press, Hourne Farm, Crowborough, Sussex. Tel: Crowborough 63819.

HAVE YOU EVER THOUGHT why there's a difference between the way you think and the way you vote? In France and Germany people are now coming to terms with this dilemma. People are beginning to come to terms with it here. Join the Ecology Party, 26(F) Main Road, Kempsey, Worcester.

TWO ENGLISH PEOPLE with child, renting farm in mountains of Catalunia, working on political ecology seek others preferably with children to take equal part, living communally. Box No. 130.

THE LAST ANTI NUCLEAR FESTIVAL — 25 December 1978 to 14 January 1979 at the Almost Free Theatre, 9 Rupert Street, London W.1. Daily from 10 am - 7 pm. Shows, films, music, children's theatre, etc; daily from 10 am — 10 pm Photo-exhibition documenting the European Anti Nuclear Movement; daily at 8.30 p.m. lectures by eminent speakers.

For further details and full programme contact: Father Xmas Union, C/o 15 Wilkin Street, London NW5 3MG Tel: 01-485-6224.

CONFERENCES

THE SECOND SYMPOSIUM ON ENVIRONMENTAL CONCERNS in Rights of Way Management will be held at the University of Michigan from October 16-18, 1979. Papers are requested in the following areas of Rights of Way Management: Planning, Construction and Maintenance, Life Sciences Research. Abstract by February 1, 1979 to: Robert E. Tillman, The Cary Arboretum, Box AB, Millbrook, New York 12545. Further information from: Dr. Dale H. Arner, Mississippi State University, Department of Wildlife and Fisheries, P.O. Drawer LW, Mississippi State, Mississippi 39762 (Tel: 601-325-3830).

THE 4TH WORLD OZONE CONGRESS, November 25-30, 1979, will be held at Galleria Plaza Hotel, Houston, Texas. Those interested in presenting a paper at this Congress are requested to submit a title and expanded abstract (300-500 words) to the Programme Committee *not later than January 1, 1979.* Additional information is available from: Richard S. Croy, Executive Director, International Ozone Institute, 14805 Detroit Avenue, Cleveland, OH 44107 (USA).

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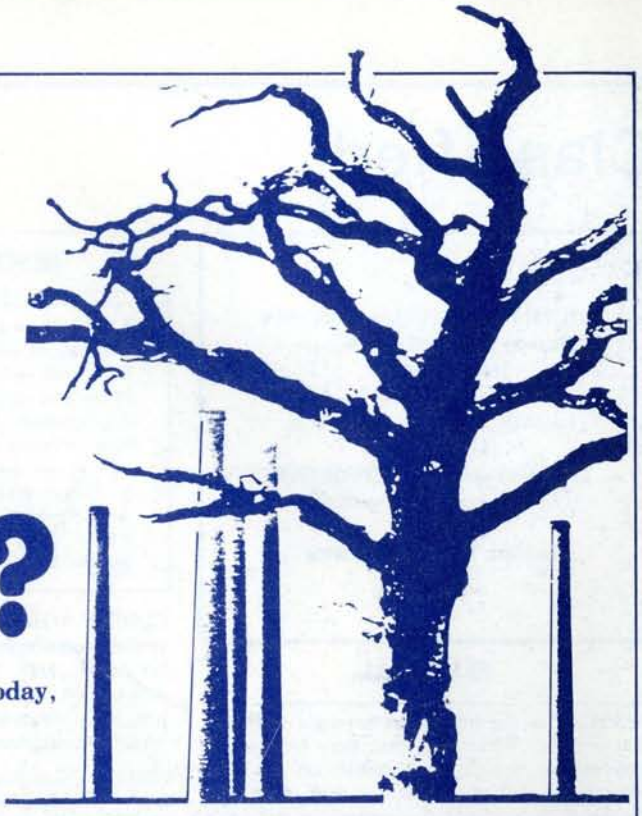

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ecology party

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