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A REPORT BY **JUSTICE**

*Plutonium
and Liberty*

*Some possible consequences
of nuclear reprocessing for an
open society*

75p

JUSTICE

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*Some possible consequences
of nuclear reprocessing for an
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*Based on evidence
presented to the
Windscale Inquiry*

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FOREWORD

The debate on nuclear power in general, and on the plutonium fuel cycle with its reprocessing plants and fast breeder reactors in particular, is one of the most extended and pervasive that we have seen for many years. It is also one of the most important, since the decisions that will be taken at the end of it will affect everyone in this country for the rest of their lives, and probably future generations as well.

One forum in which that debate was conducted during the summer of 1977 was the Windscale Inquiry – the public inquiry set up by the Secretary of State for the Environment to hear objections to the planning application by British Nuclear Fuels Limited for the construction of an oxide fuel reprocessing plant at their Windscale works.

JUSTICE is an all-party organisation of lawyers, not of economists, scientists or engineers. We would not therefore normally have thought it either necessary or useful to contribute to the debate on nuclear power, or to register an objection at that Inquiry. But the Sixth Report of the Royal Commission on Environmental Pollution, under the chairmanship of Sir Brian Flowers, and the pamphlet *Nuclear Prospects* by Michael Flood and Robin Grove-White, both published in the autumn of 1976, warned of the possibility that any nuclear power programme which puts into commercial circulation substantial quantities of nuclear explosives could have profound implications for the rule of law and for fundamental liberties in this country.

Those are matters which are central to our own area of concern. We therefore concluded that it was our duty at least to follow up the warnings which we had read, to see whether there was anything in them. First, we wrote to the Secretary of State for Energy to invite his views. Following a meeting with him attended by two of our officers, we concluded that the warnings had to be taken seriously. We therefore invited public discussion of them in a letter to the editor of *The Times* which was published on 31 March 1977, and which was followed by a substantial correspondence in those columns.

Soon afterwards we decided that we ought to offer evidence at the Windscale Inquiry. In the field of human rights, fundamental freedoms and civil liberties we have accumulated a good deal of experience during the 20 years of our existence in this country, as has the International Commission of Jurists over its 25 years in many other parts of the world. We therefore took steps to have ourselves registered as a formal objector at the Inquiry, in order to be able to make our evidence available to it.

Our evidence was prepared by Paul Sieghart, who had by then made a comprehensive study of a great deal of published and unpublished material on the subject. After it had been approved by our Executive Committee on behalf of the Council of JUSTICE, it was presented to the Inquiry on 10 October 1977, and short extracts from it were published

in the press on the following day.

We believe that the questions with which our evidence dealt require far more thorough and informed debate than they have yet been able to receive. We have therefore thought it right that the material we assembled for the Windscale Inquiry should be made available to a wider public. That is the purpose of this Report. It largely reproduces our evidence, but to enable those who are less familiar with the issues to follow the arguments, we have expanded in some places and summarised in others.

We think it important that the position of the many protagonists in the public debate should be clear, so that there should be no serious risk of misunderstanding. Accordingly, we wish to make our own position as plain as can be:—

- (a) JUSTICE is neither for nor against nuclear power: we do not have the necessary expertise to know whether the world would be able to do without it in future, or (if not) how much of it it will need.
- (b) JUSTICE is opposed in principle to the manufacture and distribution of nuclear explosives in substantial quantities for commercial use as fuels for nuclear power because it is convinced that, for the reasons developed in this Report, such manufacture and distribution could in the long term present substantial threats for the rule of law, the protection of the fundamental liberties of the individual, and ultimately for the survival of a free and democratic society.
- (c) JUSTICE believes that these threats should be debated far more fully, and in far more detail, than has yet been possible, and that the greatest possible weight should be given to them when the ultimate decisions are taken on the kind of fuel cycle which should be adopted for any future nuclear power programme in the United Kingdom.

We are of course aware that other questions than these have been raised in the current debate, such as the problems of the safety of nuclear installations, the long-term disposal of radioactive waste products, and the dangers of proliferation of nuclear weapons to nations that do not yet have them. That we do not discuss these questions in this Report does not mean that they are not important. But we must leave them to others better qualified than we are, and confine ourselves to the aspects in which we may claim to have a special expertise.

JOHN FOSTER

CONTENTS

	<i>page</i>
Foreword	iii
The background	1
The legal implications of the discharge of radioactive substances	2
The legal implications of nuclear terrorism	4
Physical guarding	6
Surveillance	7
Human fallibility	10
Response to terrorist threats	11
Interrogation of suspects	13
Some counter-arguments	14
Security and civil liberties	16
Notes	20

PLUTONIUM AND LIBERTY

The background

1 Nuclear power is produced by splitting atoms ('fission'). There are three 'fissile' elements: uranium-233, uranium-235 and plutonium. In their pure forms, all three are nuclear explosives: a given minimum quantity of any of them (the 'critical mass') can be detonated as an atomic bomb. Diluted with non-fissile uranium-238, they can be used as fuel for nuclear power stations. Whether the diluted mixture is potentially explosive depends on the kind and proportion of the fissile element. The normal fuel used in conventional nuclear power stations, for instance, is not explosive.

2 When the fuel used in those power stations becomes 'spent', it is composed largely of 'depleted' uranium-238. It also contains some highly radioactive waste products, and small quantities of plutonium, which have been created while the fuel was in the power station's reactor. The existing installation at Windscale owned by British Nuclear Fuels Limited (BNFL) is a reprocessing plant, in which those components are separated and purified. The depleted uranium-238 can be used for new fuel elements if it is 'enriched' with an appropriate proportion of fissile material. The waste products, which are highly dangerous to life, must be stored safely until they have become harmless (which, for some of them, may take thousands of years), or can be safely disposed of.

3 The separated plutonium may be used to enrich uranium fuel for nuclear power stations. At enrichment levels above a few per cent, the mixture is a potential nuclear explosive. The critical mass at 20% enrichment is about 30 kg. The critical mass for pure plutonium is about 5 kg¹. Plutonium and its compounds are also highly toxic. Inhaled in quantities of only a few milligrams, they can cause cancer of the lung². But with proper care, the material can be handled quite safely.

4 The task of the Windscale Inquiry was to consider an application by BNFL to construct a reprocessing plant for uranium oxide fuel with an annual capacity for practical purposes of 600 tonnes of spent fuel, yielding about 3 tonnes per annum of plutonium, half of which would belong to the United Kingdom and half of which would be returned to the foreign customers (notably Japan) whose spent fuel had been reprocessed.

5 The explosive varieties of uranium can be extracted from spent reactor fuel, or from natural uranium, only by processes which are highly complex and expensive, and which need large installations. But a mixture of uranium and plutonium, being composed of different chemical elements, can be separated by chemical methods alone. For quantities measured in kilogrammes, no very large plant is required.

6 Our special concern is with the possible consequences of an expanded

nuclear programme on the rights and obligations of citizens of the United Kingdom, and on the substantive and procedural aspects of our legal system. These consequences fall into two groups: those flowing from the hazards of intended or unintended discharges of radioactive substances from nuclear installations, and those flowing from the hazards presented by terrorism, and by the countermeasures designed to contain or combat it.

The Legal Implications of Discharges of Radioactive Substances

7 As we understand it, neither nuclear power stations nor nuclear reprocessing plants are designed to release no radioactivity whatever: they are — and under existing and foreseeable constraints, both of technology and of cost, they have to be — designed to release 'low-level', 'insignificant' or 'negligible' amounts of radioactivity into their environment.

8 In this respect, such installations do not differ from others in which dangerous materials are handled: many other industrial processes discharge small quantities of noxious substances into the environment. Nor are radioactive substances unique in taking a long time before they cease to be harmful to life, or in being subject to reconcentration in biological food chains and other environmental pathways: organochlorides such as DDT produce both these effects.

9 However, there would appear to be one qualitative difference between radioactive and most other noxious substance (some chemical mutagens being an exception). As we understand it, the weight of radiobiological evidence supports the view that there is no 'threshold' below which ionising radiations are totally harmless: however small the dose to which a large population is exposed, *some* individuals within that population will suffer somatic ill-effects (such as cancer or leukaemia) or genetic damage, though it may take years (and, in the latter case, generations) before the ill-effects become manifest.³

10 It is of course common practice in all modern industrialised societies to accept, tacitly or explicitly, a small cost in health, or even life, as the price of the benefit accruing to society generally from industrial processes. Road transport, which in the United Kingdom alone accounts annually for over 7,000 fatalities and over 350,000 injuries (more than a third of them serious) is one of the more obvious examples. But an essential corollary to this social acceptance of a hazard is that society must ensure that those for whom the hazard is realised are compensated as fully as they can be, either by those who create the hazard, or by those who enjoy the concomitant benefit.⁴ In the case of radioactive substances, there appear to be some substantial obstacles in the way of achieving that objective.

11 First, there is the 'background' radiation to which everyone is unavoidably exposed, and which takes its 'base level' toll in somatic disease, and genetic damage, among individuals whose statistical distribution within the population may be broadly predictable, but who cannot be identified. Secondly, radioactivity is not the only cause which can produce or precipitate these forms of damage: other agents, of which

some may not yet have been identified, may have the same effect — as in the case of lung cancer, which may follow the inhalation of plutonium oxide, or of cigarette smoke, or of exhaust fumes from diesel engines.

12 Accordingly, we foresee difficulties, which may in practice prove insurmountable, in the path of any victim wishing to prove, on the balance of probabilities, that his affliction was caused by 'low-level' radioactivity discharged from a nuclear installation, rather than by some other agent. For discharges substantially lower than the background, therefore, the position may well be that one knows, as a matter of statistical certainty, that they will cause a predictable number of fatal and debilitating diseases, and a predictable number of congenital malformations, and yet there is no means of identifying the victims in order to compensate them — unless and until society is collectively willing to compensate fully the victims of *all* illness and genetic damage; a position which our society has, at least so far, not shown any inclination to adopt.

13 In theory, this obstacle, and its concomitant injustice, should be more easily surmountable where the radioactive discharges are of the same order of magnitude as, or greater than, the background level of radiation — as in the case of a 'nuclear accident'. However, we believe that the practical problems would hardly be more tractable. Suppose an accidental discharge of radioactivity were to contaminate a tract of countryside downwind of the installation concerned. Ten, twenty, thirty or more years later, the morbidity rates of radiation-related disease among the population of that tract at the time of the accident would be at a level commensurate with the additional collective dose to which it had been exposed. But, to establish a credible case for compensation, any individual member of that population would need to discharge a burden of proof which he might find exceedingly difficult.⁵ Not only would he have to prove that he was there at the relevant time, but also that he was exposed to a substantial *individual* dose, and that his disease was not caused by some other agent. Cigarette smokers or garage mechanics who develop cancer of the lung, for example, might well find it impossible to convince a court that they would have remained free of that affliction had the nuclear accident not occurred.

14 For the victims of genetic damage in future generations, the burden of proof could be impossibly high, and their claims might well not arise until more than thirty years after the event. Besides, legal theory would need to overcome some major philosophical problems before it could grant a substantive remedy to someone for breaches of duty which took place years, or even decades, before he was conceived — let alone born.

15 Apart from relieving plaintiffs of the burden of proving negligence, and extending the normal limitation period to thirty (or, in some cases, twenty) years, the Nuclear Installations Act 1965 does not appear to us to resolve these problems: in particular, it leaves it to the plaintiff to prove causation as best he can. We are therefore driven to the conclusion that the operation of any large-scale nuclear power programme, with the inevitable increase in the total dose of ionising radiation to which the population as a whole will be exposed, will lead to a proportionate increase

in uncompensated, and uncompensatable, disease, death, and congenital malformation among individuals who form part of that population. It is not for us to judge whether that is a consequence which society should or should not accept. All we can say is that it would be an injustice: whether it is an 'acceptable' injustice is for others to determine. Those others will include some, but by no means all, of the potential victims.

The Legal Implications of Nuclear Terrorism

16 There has been a good deal of discussion in the last few years about the possibility of 'nuclear terrorism'.⁶ It may be convenient to use that expression as a generic term for four distinct foreseen hazards:

- (a) sabotage inflicted on a nuclear installation;
- (b) the detonation of a nuclear weapon constructed with fissile material abstracted from, or during transit between, nuclear installations;
- (c) the dispersion of such material as a carcinogen;
- (d) the making of political or economic demands to a government under the threat of any one or more of these.

17 It appears to be common ground that none of these hazards is totally fanciful. Some of them — and especially the construction of a nuclear weapon — may require the assembly of skills and expertise, and degrees of ruthless and politically-motivated determination, which it may be difficult to bring together without a substantial risk of detection. However, no one seems to dispute the proposition that all this is today at least possible, and must therefore be regarded as a serious potential hazard by anyone responsible for devising safeguards for nuclear installations.⁷

18 There are, logically, only two ways of guarding against this class of hazard. One is not to scale up the manufacture and distribution of fissile materials of a kind that terrorists could use; the other is to take adequate security measures designed to prevent terrorists from obtaining possession of such materials. The first of these averts the hazard altogether; the second, at best, can only minimise it: it is now well understood that there is no such thing as 'absolute security'.

19 We share the concern of others that, in an area which presents dangers of this order, security measures should be as effective as possible. We were troubled by the statement in the Sixth Report of the Royal Commission on Environmental Pollution ('The Flowers Commission') that the Commission was 'by no means convinced that the British Government has realised the full implications of this issue'.⁸ We have since been partly reassured by the statement in the White Paper on Nuclear Power and the Environment that 'security measures in connection with the transport and storage of plutonium have been greatly strengthened over the last two years, and will be reviewed at regular intervals'.⁹

20 For the same reason, we agree that the details of current security measures should not be publicly disclosed: if they were to become known

to potential attackers, that might make it easier to circumvent them. Where enemies lay their plans in secret, the plans for defence must also be made and kept in secrecy. We would not wish those defences to be jeopardised by publication of their details, and of the contingencies in which they would be brought into effect.

21 We are, however, acutely concerned with the effects which security countermeasures could have on citizens other than those against whom they are directed. We share that concern with many others, including the Flowers Commission, who have given thought to the direct and indirect social consequences of an expanded nuclear power programme. That is a subject which, in common with the Flowers Commission and the Government, we believe *should* be examined and debated publicly, as it is in our view one of the major factors to be taken into account before deciding in favour of such a programme: its social costs — as well as its benefits — should be foreseen as fully as possible before irreversible decisions are made. We share the Flowers Commission's assessment of this problem as 'in many ways the most worrying and the most difficult to assess'.¹⁰

22 In order to discuss this subject without compromising present security, it becomes necessary to confine oneself to the medium and long-term future, and to base arguments on assumptions which can only be hypothetical. Though 'scenario-building' is not popular among scientists, and is always open to the criticism that the scenario is fanciful, over-dramatic or even alarmist, we know of no other way in which matters of this kind can be usefully discussed where the present facts must necessarily remain unpublished, and future developments are still largely uncertain.

23 We begin, therefore, with two hypotheses:—

- (a) spent nuclear fuel elements will be reprocessed commercially in the United Kingdom on a scale which will result in the presence and distribution of plutonium (as metal, or in the form of its chemical compounds) in very large quantities — measured in tons;¹¹
- (b) there will continue to exist politically-motivated groups of terrorists of the kind with which we are familiar today (and which have existed in one form or another at many times in many parts of the world).

Whether the first of these hypotheses comes to pass is within our control. The second, in an open society such as ours, is not.¹²

24 Treating the spent fuel element as the beginning of the plutonium cycle and the new fuel element as its end, we believe that the risk of unauthorised abstraction of plutonium is confined to small quantities so long as it is intimately mixed with intensely radioactive waste fission products: the recovery of substantial quantities of plutonium from such a mixture would require a reprocessing plant of the kind, though not necessarily of the size, being proposed at Windscale, and the construction and operation of such an installation could hardly go undetected.

25 The phases of the cycle where plutonium could be vulnerable to illegitimate abstraction in quantity therefore begin with its separation from other substances in the spent fuel elements (currently in the form of the nitrate solution), and thence through every successive phase down to the point where the new fuel element is loaded into a reactor. During these phases, the plutonium may take the form of nitrate, oxalate, dioxide or metal; it may be contained in vessels or pipes, being processed in batches or continuously; it may be held in store or carried in transit; and it may or may not be physically mixed with other substances such as uranium oxide.

26 If it were possible to abstract plutonium from any of these phases, its concentration to a form in which it could be used as a nuclear explosive would require only chemical processes for which neither very expensive nor very large-scale equipment is needed: for use as a dispersed carcinogen, even less processing, or in some cases none at all, would be required. (In that context, we have heard estimates of the order of £100,000 for the cost of decontamination from one gramme of evenly dispersed plutonium oxide). Even after the plutonium is mixed with depleted uranium to produce an enriched reactor fuel, the mixture will still be potentially explosive unless the enrichment level is very low.¹³

27 To hold out any promise of being effective, security measures must therefore extend rigorously throughout all these phases of the plutonium cycle. Such measures may take several forms:—

- (a) physical guarding of the plutonium and the plant, stores and vehicles in which it is contained;
- (b) surveillance of all those who have, or might directly or indirectly be able to obtain, access to it in the course of their work;
- (c) surveillance of all those who might aim to obtain unauthorised access to it for malevolent purposes.

Physical Guarding

28 It is comparatively easy to protect dangerous or valuable material from abstraction so long as it remains within secure premises. Perimeter fences can be built so that they are difficult to breach, and the material can be kept behind locked doors. But that by itself is not enough: the premises themselves must be protected against attack, and the guards who protect it must be able to resist a determined opponent who might be armed. No doubt that is why the United Kingdom A E A in 1976 promoted its Special Constables Act, which places those constables on a par with the armed forces of the Crown in relation to the possession of firearms, including 'prohibited weapons', i.e. automatic weapons. But there is one matter here which disturbs us, as it has disturbed several Members of Parliament, and also the Flowers Commission. The armed forces are ultimately answerable to Parliament through the Secretary of State for Defence. Police forces (who are generally not armed with firearms, and certainly not with automatic ones) are normally¹⁴ answerable to elected police authorities or, in the case of the Metropolitan Police, to Parliament through the Home Secretary. By contrast, the

chief constable of the A E A's special constabulary is answerable only to that Authority, which is an appointed and not an elected body. A long-standing parliamentary convention decrees that Ministers are not answerable to Parliament for matters falling within the day-to-day responsibilities of nationalised boards. Unlike all other State forces, armed or unarmed, this one is therefore not under direct political control. It is true that, during the debates on the 1976 Act, the present Secretary of State undertook 'to be ready to answer in the House in relation to any incident in which weapons were fired by the Special Constabulary other than for training purposes'.¹⁵ But that concession is very limited, and we view with some concern the creation of a constitutionally unique armed force of this kind, however desirable its existence and equipment may be in the interests of security. It occasions us no surprise that it has already attracted the sobriquet of a 'private army': its structure conflicts with all our traditions of civilian and politically accountable policing.

29 So long as such a force is confined within the perimeter fences of nuclear installations, it will not visibly affect the ordinary citizen going about his lawful business. But in a future 'plutonium economy' as hypothesized by the Flowers Commission, there will be many transfers of plutonium between such installations. (The Commission estimated 'several hundred per year by 2000 and several thousand by year 2030'.¹⁶) Clearly, such transfers too will need to be guarded, and the Government have now confirmed¹⁷ that armed guards will be used. In that event, we will have members of an armed force, necessarily trained to use lethal firearms with lethal effect if in their judgement the immediate situation demands such use, frequently — indeed constantly — at large within the community, sharing railways and highways with many other users, and on the *qui vive* against ambush and attack. That too is a situation which would cause us serious misgivings.

Surveillance

30 If the risk of abstraction of plutonium from nuclear installations is to be properly guarded against, it is not enough to protect the installations from outside attack. Someone with legitimate access to the plant might make off with the material: indeed, that is much the most likely risk. Closing that exit route will necessarily involve daily and routine physical search of some or all of the employees who work at such an installation. Such procedures may be unpleasant and sometimes humiliating, but it could be argued that no one is obliged to work at such an installation, and that in choosing such employment he or she may be taken to consent to searches. To quote from an American report 'Obviously, the result of such measures would be to create a somewhat intimidating work environment — all employees might have to file past armed guards, might be required to change into uniform while under observation, and might be subject to constant on-job surveillance. Employees might also be subject to temporary detention whenever S N M [Special Nuclear Material] was unaccounted for at the end of any shift. There is no denying that... such a regimented work environment is at odds with what many would regard as socially and politically acceptable.'¹⁸

31 However, we do not suppose that physical search alone will be enough: the exigencies of the situation will demand far more extensive surveillance of workers, so that those who exhibit any signs of being or becoming possible security risks can be rapidly identified. What troubles us here is the fact that, if such a policy is to be effective, it will be impossible to confine it to the workers themselves — who are the only ones who can be said to have expressly or impliedly consented to it in seeking such employment. Sooner or later, in isolated cases, in groups or perhaps more generally, it will have to be extended to their families and their 'known associates'. In some cases at least, it will have to be extended to casual acquaintances, among whom might be the very people who are seeking to bribe, blackmail or seduce them in order to obtain plutonium, or information about plutonium or about the means of safeguarding it. Where plutonium is transported, similar precautions will need to be taken for those transport workers who will need to know about consignments and their routes — and *their* families, friends and associates.

32 Among the groups of this kind to which at least some surveillance will have to be extended on at least some occasions, there are bound to be individuals who are in fact perfectly harmless citizens. It may be argued — and often is — that someone who has nothing to hide should not be troubled if the police, or the security services, keep him under surveillance, investigate his activities, tap his telephone, or read his mail. Within limits, that may be true. But the limits must be drawn very narrowly indeed. Many people have nothing to hide that is unlawful, but much to hide that might lower them in the esteem of their neighbours, lessen their prospects of employment or promotion, disrupt their personal relationships, or merely leave them with a painful sense of an invasion of their privacy. We believe that a free society, in any sense of that expression which has any useful meaning, is one which allows its members to lead their lives as they please so long as they do not damage others, and extracts from them only the minimum amount of information about themselves that is demonstrably necessary to protect other members of the society from ascertainable harm. No doubt in an ideal world, composed exclusively of wise, libertarian, tolerant, cooperative and altruistic citizens, a higher degree of transparency about everyone's private life might be acceptable and perhaps even desirable. But the real world falls far short of that ideal, and in the world as it is we are compelled to regard any large-scale system of official surveillance of harmless citizens as an infringement of their human rights and fundamental freedoms. In this, of course, we do no more than support the guarantee for privacy in International Human Rights Law: Article 12 of the Universal Declaration of Human Rights, Article 8 of the European Convention on Human Rights and Fundamental Freedom, and Article 17 of the International Covenant on Civil Rights — all of them instruments by which the United Kingdom is bound.

33 Similar considerations apply to the surveillance of suspected terrorists. To be effective in combating their activities, it is essential to identify the individuals concerned, and to have advance knowledge of their plans. But here again, the net must necessarily be cast widely enough to bring within official scrutiny anyone who *might* prove to be a terrorist,

or a supporter on whose help terrorists can rely. That net again will therefore inevitably include some citizens who in fact have no connexion with terrorists or terrorism — or at least are not aware that they have.

34 Intelligence work of this kind requires the collection, collation, analysis and evaluation of very large numbers of small items of information, each of which may itself appear innocuous. The processing of such information has in recent years been much facilitated by advances in the technologies of computing and telecommunications. According to an article in *The Times* on 14 February 1977, the Metropolitan Police is currently planning to instal an advanced computer system to store and collate intelligence information on 'crimes, criminals and their associates'. Five branches of the Metropolitan Police will hold records in that system. The largest file already held 1,150,000 names in 1974 under 27 areas of interest, and about half of its records would be computerised. It was not clear from that article which branch was responsible for that file, but according to a further article in *The Times* on 9 September 1977 it is the Special Branch, to which space for up to 600,000 names has been allocated in the system.

35 The contents of those articles have not, so far as we know, ever been denied by the Metropolitan Police, or anyone else. Instead, the response has been that any discussion of this system would be a 'breach of security'. In answer to a recent Parliamentary Question, the Minister of State at the Home Office confirmed that the system is under development, but gave no further information about it.¹⁹

36 We find it difficult to suppose that, among the 'criminals and their associates' on which intelligence information is intended to be held by the Metropolitan Police, there will not be some who are neither criminals, nor knowing associates of criminals. That such an extent of surveillance may be necessary today to prevent or detect crime of one kind or another does nothing to allay our disquiet that it should need to be carried on, and that it cannot be publicly debated, even to the extent of its general strategy.

37 Nor do we find the Government's public statements reassuring on this point. It has been officially announced that surveillance in the context of nuclear power will only extend to bodies and individuals where there is reason to believe that their activities are 'subversive, violent or otherwise unlawful'.²⁰ We have of course no objection — indeed we welcome — the keeping of a proper watch on those who plan violent or other seriously unlawful acts, in order that others may be protected from their malign activities. But we know of no crime of 'subversion' in English law, nor are we enlightened by what appears to be the Government's working definition of that concept, as given to Parliament by a Home Office Minister: 'Subversion is defined as activities threatening the safety or wellbeing of the State and intended to undermine or overthrow parliamentary democracy by political, industrial or violent means'.²¹ Under that head, authority could readily — and secretly — be given for the surveillance of individuals or bodies having political, religious or philosophical views or beliefs of which the government of the day happens to disapprove, though there may be nothing unlawful about those views

or beliefs, or the activities of those who hold them.²² Besides, such surveillance might never become known to the bodies or individuals concerned, and they would have no means of having it stopped, or having themselves taken off the 'subversive' list.

38 Moreover, if and so long as we reprocess nuclear fuels for other countries, such fuel might be perceived as a legitimate target for their 'subversive' bodies or individuals. In such circumstances, our own security services could come under serious — and perfectly legitimate — pressures to extend their surveillance to such people in this country, perhaps even in cases where their political views — though not of course their apprehended activities — were shared by a majority of our own citizens.²³

39 Another official statement which troubles us is that which relates to positive vetting.²⁴ That procedure may be distasteful to the person who is subjected to it, but he has the choice whether to apply for, or accept, a security-sensitive post which requires it. However, in the course of positive vetting very extensive and searching enquiries need to be made not only about the subject, but about his family, friends and associates. Among those again there may be perfectly harmless citizens.

40 But beyond that there are the problems of negative vetting. We believe those to be far greater. Where the responsibilities of the individual concerned will not be sufficiently sensitive to warrant the expense of the detailed enquiries and investigations required for positive vetting, negative vetting may be confined to no more than some common-form inquiries from a few central sources, including the Criminal Record Office. Any adverse report may disqualify the applicant, but he will not be given the opportunity of challenging or explaining it. Very many such reports are obtained annually by central government and by some nationalised industries such as the Post Office and the A E A. Some of them will relate to employees of private industry, especially where government contracts are being let. It appears to us that this procedure must necessarily entail the risk of grave injustices in some individual cases, as for example where there is a mistake over identity (because several people may have the same name), or in the evaluation of an adverse report because the facts there reported are inaccurate, incomplete or out of date.

41 It seems to us that the development of a 'plutonium economy', while terrorism continues to be prevalent, cannot fail to lead to a great increase in negative vetting procedures. That too is a prospect which, in the interests of justice to the individual citizen, must cause us severe misgivings.

Human Fallibility

42 The dangers of human fallibility in man-made systems are well known. They are especially great in matters of security, where everything ultimately depends on the loyalty and devotion to duty of individuals. Despite what must be the most stringent precautions, espionage by hostile powers still succeeds, at times dramatically. Sometimes the spy is not even detected and apprehended, as in the case of Burgess and

MacLean — or, years later, their colleague Philby — especially where he has accomplices within the security service itself.

43 We are therefore troubled that even the most stringent security measures will sooner or later be circumvented because someone has been careless, or has been induced, seduced, inveigled or forced to cooperate with a terrorist group. Those responsible for security cannot be assumed to be themselves immune: there is at least one recorded instance of a senior security officer of the U.S. Atomic Energy Commission who was found to have borrowed \$239,000 from fellow-employees and was ultimately convicted of failing to pay back \$170,000, most of which he had lost on horses.²⁵

Response to terrorist threats

44 For these reasons, we do not believe that even the most stringent security measures can absolutely guarantee that no plutonium can ever be illegitimately acquired. That scepticism appears to be shared by the Government in its recent White Paper which speaks only of 'severely restricting' (as opposed to preventing) the availability of plutonium, and 'reducing' (as opposed to eliminating) the risk of successful terrorist action.²⁶ We believe that these qualified expressions rightly describe the best that can realistically be expected.

45 In the same White Paper,²⁷ the Government rightly draws attention to the additional cost of security measures, and to their effect on the cost of nuclear power. If cost is to be — as it must be — one of the limitations on security countermeasures, then it becomes even more necessary to consider what one might call the final scenario, namely the response to a real terrorist nuclear threat.

46 There is no published information on whether any such threat has yet been made. The Government has assured us that no 'credible' one yet has.²⁸ Clearly, the first task of any government which becomes aware of such a threat is to assess its credibility. With the large number of lives at stake, it seems reasonable to suppose that governments will not believe that they can afford to err on the wrong side: if there is a real indication of credibility, the full response must be put into effect.

47 In other circumstances, the first credibility check would be to see whether any plutonium was known to be missing. It is in this context that we see the relevance of material unaccounted-for ('MUF'). We accept that in any large-scale industrial process it is never possible to account for all the material that is being processed. We also accept that the fact that the material is unaccounted-for does not by itself indicate that any material has in fact been abstracted. But it appears to us that, once cumulative quantities of MUF have reached levels of the order of 100 kg²⁹, it is no longer open to anyone to say, with the high degree of confidence which the ignoring of a threat on the ground of credibility alone would require, that no plutonium had been abstracted at any time. That, to us, is the true significance of MUF. In any case B N F L itself concedes³⁰ that materials accounting provides no assurance that material has not been stolen: that assurance rests only on 'the integrity of the security

measures employed on the plant' — an integrity which cannot, in the nature of things, be absolutely guaranteed.

48 If the Government should ever find itself faced with a threat which it feels bound to treat as credible — e.g. because it is accompanied by credible details of the construction of a nuclear weapon, and/or a small quantity of genuine plutonium³¹ — we believe the consequent scenario summarised by the Flowers Commission³² to be realistic, and by no means exaggerated: there would have to be wide scale and determined searches, general search warrants and probably restrictions on the rights of movement and assembly, and the suspension of *habeas corpus*. But we would add some additional considerations.

49 If the weapon were said to be located in a known urban area, very large numbers of people would have to be evacuated, probably very quickly. No doubt most of them would cooperate readily. But some who were senile, inarticulate, sick, confused or merely stubborn might refuse, and some degree of force would have to be used to ensure their safe removal from the danger area. Any such operation might well — as the Government seems to anticipate³³ — require the use of the armed forces, especially to prevent subsequent looting. The Government nevertheless asserts that there is no reason to suppose that these measures 'would have a significant impact on the liberties of individual citizens'.³⁴

50 If there were time, it would be necessary to conduct a ruthless search of the area. To have his house ransacked from roof to cellar is unpleasant enough for the most innocent of citizens. But in the course of such a search, it is inevitable that evidence will come to light of activities which have nothing to do with nuclear terrorism, but are disreputable or even unlawful. Instances can readily be imagined.³⁵

51 Here again, it may be argued that people have only themselves to blame if their disreputable or unlawful activities are discovered. But we cannot accept this, partly for the reasons we have already given in paragraph 32 above, but more importantly because, since at least the 18th century, English law has consistently refused to allow the organs of the State any general power of search or seizure: indeed, the English case of *Entick v. Carrington*³⁶ is regarded in the United States of America as the origin of the Fourth Amendment to the US Constitution. It has been a long-standing, albeit tacit, principle of our social system that the function of the police is to investigate known crimes and discover the perpetrators, not to investigate known citizens and discover whether they have perpetrated any crimes. That principle is highly valued, particularly by our police forces, and forms an essential member of the institutional structure of our present society.

52 We believe that this principle could easily be compromised, if not reversed, in the event of a credible threat such as the one which we — following the Flowers Commission and others³⁷ — postulate. It is difficult to suppose that, on such an occasion, an amnesty would be declared for every offence found to have been committed which had no connexion with nuclear terrorism.

53 Moreover, following such an incident — whatever its outcome — there could not fail to be a violent public reaction demanding greatly intensified security measures, and greater emergency powers, which even the most liberally-minded government might find it difficult to resist — especially if similar incidents were repeated. We view with the gravest concern the kind of society in which our descendants might ultimately find themselves living if such a scenario became real.

Interrogation of Suspects

54 A further matter which causes us concern is what would happen if someone were apprehended whom the authorities thought there was reason to suspect of having knowledge about intended or actual nuclear terrorist activities.

55 Our security services have so far conducted themselves impeccably in this respect within Great Britain: we know of no documented case where they have used torture or violence on a suspect. But, regrettably, that has not always been true of our security forces operating in what used to be our colonies — as for example Malaya, Palestine, Kenya or Aden — nor, at all events for a brief period, in Northern Ireland. Following the Compton Report³⁸ on the last-mentioned of these episodes, the Government accepted Lord Gardiner's dissenting views in the Parker Report,³⁹ and the use of any such techniques in the future would at least lack official sanction, and presumably conflict with official instructions.

56 Nonetheless, it needs little imagination to envisage the pressures on a field officer interrogating someone who has, for example, been apprehended while trying to smuggle a gramme of plutonium out of a nuclear installation — let alone someone suspected of membership of a gang that has just made a credible nuclear threat due to be carried out within hours.

57 Here again, English law has leant heavily, and for several centuries, against police powers of interrogation: the 'right to silence' is sacrosanct and backed by the requirement that arrested suspects must be brought before a magistrate within a very short time. Yet even that safeguard has been much weakened by the Prevention of Terrorism Act 1974 — now on the way to becoming a permanent feature of our statute-book — following the detonation of several conventional bombs in Great Britain by the I.R.A. In the context of the damage which even an amateur nuclear weapon might wreak, those bombs come to appear almost insignificant. Clearly, in the face of an actual or contemplated nuclear threat, Parliament could hardly refuse the Government far more draconian powers.

58 To quote the author of one of the early studies of this subject in the United States of America, Russell W. Ayres: 'To the extent that we have civil liberties at all today, it is because we have not had to ask questions like whether it is better to torture a suspected terrorist than to let a city go up in flames.' That comment was, of course, made in the context of a legal system where the fundamental civil liberties are protected by an entrenched Bill of Rights, which neither the Legislature, nor the

Executive, nor the Judiciary can amend, abrogate or even suspend. We have no such ultimate constitutional safeguards.

Some Counter-arguments

59 We must now turn to consider several counter-arguments which have been put forward to meet the worries we have expressed so far.

60 The first is that thousands of military nuclear weapons have been deployed in many parts of the world for decades, yet there has not been a single reported attempt at the theft of one by any terrorist group. Assuming that to be the case, we would think that this fortunate state of affairs must have been largely contributed to by three special factors:—

- (a) complete military nuclear weapons are objects of substantial size and weight, difficult to steal secretly or to transport or hide — unlike plutonium, a critical quantity of which could be collected over time from many repeated thefts of very small parcels;
- (b) such weapons are under permanent military guard at sites of the highest possible security, and there are no regular or routine movements of them between such sites;
- (c) it is known that such weapons are protected by very sophisticated safeguards against unauthorised dismantling, let alone unauthorised detonation.

61 A second counter-argument is the possibility of 'nuclear parks'. i.e. the location of several nuclear power stations and their associated reprocessing plant at a single site protected by a single perimeter fence. We have seen no published study of the economic feasibility of such a concentration. There are several obvious objections to such a scheme: electrical power stations of any kind need to be close to very large supplies of cooling water, and the high costs of electricity transmission argue for proximity to centres of consumption. So does the desirability of combined heat and power, emphasised by the Flowers Commission⁴⁰ as an important means of improving the overall efficiency of conversion of primary energy (currently only of the order of 30% or less). In any event, such a concentration could only reduce the risk of abstraction of plutonium during transit, and not during any other phase of the cycle.

62 Next, there is the possibility of 'spiking' new fuel elements containing plutonium, either by loading them into a small reactor at the reprocessing plant and allowing enough fission to take place to produce an admixture of radioactive fission products, or by including in the containers in which they are transported an extraneous source of powerful radioactivity such as cobalt-60. The second method would be designed to deter abstraction during the transport phase only (unless the spiking material was included in the fuel element's own cladding): the first would extend from the time of irradiation up to the final loading into the reactor which they are intended to fuel. In each case, the risks of abstraction during the other phases would remain unaffected.

63 Here too, we know of no published feasibility study. And here

too, there are some obvious difficulties. Clearly, both the storage and the transport of 'spiked' fuel elements would involve greater risks of accidental irradiation of those who have to handle them than in the case of inert ones. Also, the handling costs would be greatly increased, since all handling of 'spiked' material would need to be done with remotely-controlled equipment. An additional risk would be of damage to people and the environment in the event of a major accident to a 'spiked' container — as for example if it were to be dropped by a dockside crane on to a stanchion from a height greater than that contemplated in its design criteria, or if a ship carrying several of them were to suffer a major fire, perhaps through colliding in harbour with a loaded oil tanker. Nor is it yet clear, in the absence of inter-governmental agreement, whether others for whom we have agreed to reprocess spent fuel in the United Kingdom would be willing, or could be persuaded, to accept their new fuel elements in 'spiked' form.

64 Further, we believe it is sometimes too readily assumed that terrorists will be at least rational enough to wish to preserve their own lives. We would point out that the evidence does not support this: the determined terrorist may be so deranged by his political monomania as to be perfectly willing to sacrifice his life as a martyr to his cause — as in the case of the members of the Japanese 'Red Army' who perpetrated the senseless massacre at Lod Airport. To guard against dangerous lunatics of that kind, the amount and kind of radioactivity required for 'spiking' might have to be such as to kill or disable anyone who opened the container, or attempted to handle its contents, within minutes rather than hours. Such an intensity of radiation might well not be acceptable on other grounds.

65 This may be a convenient point to discuss a more general counter-argument. It is often asserted that all these matters must be considered in a much broader framework than the United Kingdom alone. Terrorism, it is rightly said, is an international phenomenon, and so is nuclear power. Sooner or later other countries will begin to reprocess nuclear fuel, and manufacture plutonium for themselves. It is therefore in the interests of the United Kingdom — not least its economic interest — to be among the first to take advantage of the technical skills and know-how which it has already accumulated in this field.

66 That argument has obvious attractions. But on closer analysis it becomes plain that it is an argument from despair. Reduced to its crudest form, it is the familiar plea that 'if I don't do it, someone else will'. If that plea were tenable, it could (in a world which contains much evil) be used to justify almost anything.⁴¹ Since it leads to patent absurdity, the plea is clearly not tenable, and that for several reasons.

67 First, it is by no means given that, if the United Kingdom were to choose not to be among the first to promote a plutonium economy, other nations might not hesitate in like manner. Both the Ford and the Carter administrations in the United States have recently expressed grave doubts as to the wisdom of proceeding in that direction. If the United Kingdom were to adopt a similar policy at a critical time like the present (as Austria,

Denmark, Korea, the Netherlands, Sweden, Switzerland and Taiwan already have), that – rather than a race to be among the first – might become the objective generally accepted as creditable among other members of the international community, perhaps to be eventually agreed upon in an international convention. As the Foreign and Commonwealth Secretary has recently said ‘Nuclear non-proliferation is an area in which Britain has an influential voice’.⁴²

68 Secondly, the mere fact that others adopt a particular course of conduct does not justify that conduct for oneself *if*, on persuasive grounds, one sincerely believes it to be wrong.

69 Thirdly, even if others develop a plutonium economy, there could be advantages to the enlightened self-interest of the United Kingdom in not taking part in that development – especially in the area of our own concern as outlined in this statement. Whether plutonium is ‘the’ most dangerous substance known to man (as some have suggested), or only one of them (as others contend) is a sterile question. As the Government rightly says in the White Paper, ‘However the hazards of plutonium are rated in relation to those posed by other dangerous substances, it is certainly a possible target for terrorists’.⁴³ What principally attracts potential nuclear terrorists are what have been called the ‘charisma’ of plutonium, and the ‘theatre’ of a nuclear threat. One possible way of reducing those attractions is not to keep the substance in one’s territory. International nuclear terrorists are inherently less likely to set the scene of their outrages in a country known to have denied itself the magic material, and through whose ports they would have to smuggle it – with at least some additional risk of detection – after having incurred all the risks of stealing it in the first place. Besides, if the Flowers Commission and the others (including ourselves) who have considered this hazard are even remotely right in their assessment of the indirect risks to civil liberties from a plutonium economy, choosing not to have a domestic one yields at least the benefit of maintaining one’s society at a higher level of individual freedom than would otherwise be possible. However one balances that benefit against other considerations, such as the economic ones – and they are not of course directly commensurate – that is a substantial bonus.⁴⁴

70 By contrast, every scaling-up of plutonium production anywhere in the world will necessarily scale-up the hazard of nuclear terrorism – there and, at least in some places, elsewhere.

71 Finally, it has been pointed out that plutonium is not unique in being an extremely dangerous substance, and so an attractive target for terrorists. That is doubtless true: in an increasingly technological society, there will be other substances and installations with comparable attractions. But the question is whether there are sufficiently cogent reasons for adding a new set of unusually ‘charismatic’ targets to those which we have already.

Security and Civil Liberties

72 We wish to make one final submission on a more general theme. It

is a commonplace that the interests of security and liberty do not always appear to coincide, and seem sometimes to be directly opposed to each other. Security within a society requires an element of authority, a degree of compliance with its rules, and sanctions (including the ultimate use of force) against those who fail or refuse to comply. All these are restraints on perfect freedom, but up to a point they are necessary restraints if liberty is to be preserved: for a society in which authority ceases to function, and in which freedom degenerates into irresponsible licence, is no more free than an over-regulated one.

73 In Great Britain, we have been remarkably fortunate for several centuries in evolving successful compromises between these sometimes conflicting considerations. During that time, we have enjoyed – at all events in comparison with other contemporary societies – both a high level of security and a high level of freedom. At least one factor which has contributed to that desirable state of affairs has been the conduct of our security services, and the sensitivity to political and public opinion exhibited by those who have charge of them – despite the long-standing tradition which excludes effective parliamentary control, or even investigation, of any matters which Ministers assert to have implications for national security.

74 We are anxious to ensure that the delicate balance on which that social structure presently depends should persist, and not become subject to strains of a kind or degree which might topple it. Through the studies conducted by the International Commission of Jurists over the last 25 years, we know of far too many countries where this has happened, often with calamitous results.⁴⁵

75 In such cases, the course of events tends to follow a classical pattern. A society, originally open and democratic, contains a few dissenters who manage to convince themselves, and each other, that the injustices which they perceive in ‘the system’ cannot be remedied without a revolution. The society, understandably, perceives such dissenters as a threat to its security and seeks to protect itself against them. They respond with increasing violence: shootings, bombings, kidnappings and other acts of terrorism. In return, the society becomes increasingly security-conscious: *habeas corpus* is suspended, the rights of assembly and association are severely restricted, press censorship is introduced, a state of emergency is declared. The tragic end of such a process is often a military coup, the dissolution of all elected assemblies, permanent rule by martial law, curfews, large-scale arrests, torture of suspects, detention without trial – and the ultimate loss of all the civil liberties which the society was originally concerned to preserve, and to defend against its enemies.

76 The maintenance of such a regime, often for many years, is thereafter justified by its government in the name of ‘security’, and the concept becomes an obsession. Such ‘security states’ can be found today, in different degrees, throughout South and Central America: indeed, only three or four countries now remain in that area which can still be described as reasonably free democracies. All the countries of the Eastern

bloc fall within the description. So do several in South East Asia, including particularly Cambodia, Indonesia and the Philippines. India, Pakistan and Sri Lanka have at times come close to them. Iran, Iraq, Libya and Ethiopia are other examples. To some extent, until very recently, Spain and Portugal exhibited some of the same characteristics. South Africa and Rhodesia are presently approaching the same condition.

77 In depicting this road to ruin, we do not of course mean to suggest that we are likely to follow it in the foreseeable future in Great Britain. But in the long run the risk must exist for us as it does for others; as the Flowers Commission rightly observes in another context, 'We see no reason to trust in the stability of any nation of any political persuasion for centuries ahead'.⁴⁶

78 It is this consideration which founds our concern, shared with the Flowers Commission and many others, over the security implications of a future plutonium economy — or, more precisely, over the indirect effects which the necessary security measures might produce within our society. No other source of energy presents comparable security problems. Its mere existence in substantial quantities in a country may require pervasive security measures. To be effective, such measures must necessarily be planned in secret, operated out of public sight, and put into effect instantly and totally in the event of an emergency. The Flowers Commission, as is clear from their report, were unable to investigate the subject fully.

79 In that situation, there is a very real risk of what has come to be known as 'drift': a slow progression, often not even perceived by those who take part in it, from contingency plans to policy options, thence to feasibility studies, to procurement, and ultimately to deployment of countermeasures — all without any reasoned critique from the political processes.⁴⁷

80 At none of the later stages can there, in the nature of things, be an opportunity for open public debate. We therefore think it of the first importance that such a debate should take place while there is still time to consider the implications of what might happen in the future. There is no other means of independent review. If there is a foreseeable risk of an insidious but irreversible progression towards circumstances in which a 'security state' could become a real possibility in Great Britain, then the safeguards against such an eventuality must be devised as soon as possible, and their consequences fully thought through. As one of the United States reports says, 'because the consequences of sabotage of a reactor or of a loss or successful theft of S N M (leading to the possible manufacture and detonation of a nuclear weapon) are so enormous, the issue of safeguards acquires an urgency and significance which regulatory policymakers are not accustomed to facing. The decision to embark on a new technology such as plutonium recycling is one that necessarily entails the imposition of rigorous safeguards to avoid the loss or theft of S N M; once the decision to employ the new technology is made, the pressure to employ safeguards procedures that give as great an assurance of effectiveness as possible will be enormous, whatever the implications of those safeguards procedures on civil liberties. In a society

such as ours, which values political freedom and individual rights highly, it becomes essential to evaluate the impact of prospective safeguards measures on civil liberties as part of the process of making the decision as to whether to embark on the new technology that will require the imposition of those safeguards'.⁴⁸ And among that report's conclusions is this: 'If extensive surveillance of outside groups is considered necessary in order to provide an adequate degree of security for S N M, the costs in terms of civil liberties would be substantial and may well not be justified by the benefits of a more efficient nuclear power industry'.⁴⁹

81 We hope we have made it plain that JUSTICE is not opposed to nuclear power as such. We are well aware that a future shortage of energy would be very painful, and might hold its own dangers for civil liberties and the rule of law — though it is only fair to point out that this is a state of affairs of which all societies have many centuries of experience, and indeed there are countries today with very little energy and a high level of freedom, as there are high-energy countries governed by repressive tyrannies.

82 We are well aware that plutonium is not the only dangerous substance that can exist in a modern highly technological society, that there are other possible targets for people of malevolent disposition, and above all that any decisions about any of the component parts of a plutonium fuel cycle must take into account many factors of different (and inherently incommensurable) kinds, many known facts, and many areas of uncertainty. Beyond agreeing wholeheartedly with the Government that these decisions must be taken openly and only after the fullest possible informed public debate, we can do no more than to voice in that debate the anxieties in our own area of concern.

NOTES

- 1 *Power Engineering*, August 1977, p 43, fig. 3.
- 2 *Sixth Report of the Royal Commission on Environmental Pollution* ('Flowers Report'); September 1976, HMSO Cmnd 6618; paras 66-77.
- 3 *Ibid*, paras 51-52.
- 4 See the JUSTICE report, *No Fault on the Roads* (1974)
- 5 In a lecture delivered to the British Nuclear Energy Society on 19 May 1977 and reprinted in that Society's *Journal* in October 1977, Dr N.L. Franklin, Chairman and Managing Director of Nuclear Power Co. Ltd, says: 'It is, of course, impossible to distinguish between naturally occurring and irradiation-induced malignancies, and the subject can only be dealt with on a statistical basis. To the individual, statistics are of no importance if he believes that his malignancy is irradiation-induced. For this reason, the treatment of individual cases poses great problems.'
- 6 See, e.g. *Flowers Report*, Ch. VII; and M. Flood and R. Grove-White, *Nuclear Prospects* (FoE/CPRE/NCCL, 1976).
- 7 See the conclusions of the *Flowers Report*, para 324; *Ranger Uranium Environmental Enquiry, First Report*, Australian Government Publishing Service, 1976 ('Fox Report'), p 153; *Nuclear Power Issues and Choices*, Ballinger, 1977 ('Ford/Mitre Report'), pp 305-6. The US Energy Research and Development Administration (ERDA) has now demonstrated the construction and detonation of a weapon made from 'reactor grade' plutonium: see *The Times*, 9 September 1977, p 1.
- 8 *Flowers Report*, para. 325.
- 9 Cmnd 6820, para. 35.
- 10 *Flowers Report*, para. 505.
- 11 According to the evidence presented to the Windscale Inquiry by B N F L, 7½ tonnes of separated plutonium are already in store at Windscale; by the year 1990 a further 30 tonnes will be produced; and by the year 2,000 about another 30. By comparison, the current estimates for *shipments* alone in the US A are 5 tonnes for 1980, 273 tonnes for 1990, and 1,170 tonnes for 2,000: See *Nuclear Proliferation and Safeguards*, Appendix III - C, Table 1; US Congress, Office of Technology Assessment, 1977.
- 12 There are, of course, some countries in which no terrorists currently operate — such as Brazil and the USSR.
- 13 See Note 1 above.
- 14 There are exceptions, such as the (unarmed) Railway Police.
- 15 *Hansard (H C)*, 5 May 1976, col. 1230.
- 16 *Flowers Report*, para. 159.
- 17 *Long-Term Security of Nuclear Power*, Department of Energy Press Notice, 2 June 1977, p 6.
- 18 *Civil Liberties Implications of a Safeguards Programme for Special Nuclear Material in the Private Nuclear Power Industry — Report to the Nuclear Regulatory Commission* ('Dyk Report'); T.B. Dyk *et al*; Wilmer, Cutler & Pickering, Washington, D.C., 1975, p 34.
- 19 *Hansard (H C)*, 7 July 1977, cols 631-2.
- 20 *Long-Term Security of Nuclear Power*, p 4.
- 21 *Hansard (H L)*, 26 February 1975, col. 947.
- 22 These might, for example, include the wish to defeat, by industrial action, pay policy as approved by Parliament; or conceivably even the desire to abolish the House of Lords by political means.
- 23 As might have been the case, for example, had we been processing nuclear fuel for the Spanish power industry while the Franco régime was still in power.
- 24 *Long-Term Security of Nuclear Power*, pp 2-3.
- 25 *Nuclear Power*, Walter C. Patterson, Penguin Books, 1976; p 265.
- 26 Cmnd 6820, para. 37.
- 27 *Ibid*.
- 28 *Long-Term Security of Nuclear Power*, p 9.
- 29 In B N F L Document No. 188, put in evidence at the Windscale Inquiry, B N F L gave the net cumulative plutonium MUF from the UK civil reprocessing programme from 1970/71 to 1976/77 inclusive as 98.1 kg.
- 30 Supplementary Statement of Evidence at the Windscale Inquiry of Mr D.G. Avery, Deputy Managing Director of B N F L, para. 5.
- 31 See *Fox Report*, p 154.
- 32 *Flowers Report*, para. 333.
- 33 *Long-Term Security of Nuclear Power*, p 5.
- 34 *Ibid*.
- 35 Among the more likely discoveries might be stolen property, illegal immigrants, prohibited drugs, pornography, and cash otherwise unaccounted-for.
- 36 (1765) 19 How. St. Tr. 1029.
- 37 See, for example, *Nuclear Prospects (supra)*, and *Policing Plutonium: the Civil Liberties Fallout*; Russell W. Ayres; [1975] Harv. Civ. R. Civ. L. R. 369.

- 38 Cmnd 4823.
- 39 Cmnd 4901.
- 40 *Flowers Report*, para. 513.
- 41 As, for example, an application for the vacant position of controller of the gas supply at Buchenwald concentration camp in 1943.
- 42 Speech to the Royal Institute of International Affairs, 19 May 1977.
- 43 Cmnd 6820, para. 37.
- 44 'The nuclear industry's favourite taunt to its critics is: "Well, do you want to go back to candles?" That is hardly the choice we face, of course, but if it were, then I should rather read the Bill of Rights by candle light than not have it to read at all.' — D.D. Comey, 'The Perfect Trojan Horse', *Bulletin of the Atomic Scientists*, June 1976.
- 45 See, for example, the I C J Reports on: Argentina (1975), British Guiana (1965), Central and Eastern Africa (1978), Chile (1974, 1975 and 1976), Cuba (1962), East Pakistan (1971), Hungary (1958), Iran (1976), Latin America (1975), Liberia (1961), Panama (1964), The Philippines (1977), South Africa (1960, 1967 and 1975), Spain (1962), Tibet (1959 — 2 reports), Tunisia (1961), Turkey (1973), Uganda (1977) and Uruguay (1974, 1975 and 1976).
- 46 *Flowers Report*, para. 167.
- 47 See *Harmless Weapons*; a Report by the Council for Science and Society; Barry Rose, 1978; and Dr Franklin's lecture (*supra*, Note 5).
- 48 *Dyk Report*, *supra*, pp 2-3.
- 49 *Ibid*, p 117.

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