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Thinking About Nuclear Weapons

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Glossary

ABM	Anti-ballistic-missile (defences)
CTBT	Comprehensive Test Ban Treaty
ICBM	Inter-continental ballistic missile (over 5500 km range)
IRBM	Intermediate-range ballistic missile (2400-5500 km range)
MBFR	Mutual and Balanced Force Reductions
MRBM	Medium-range ballistic missile (800-2400 km range)
NATO	North Atlantic Treaty Organisation
NFU	No first use (of nuclear weapons)
NWFZ	Nuclear-weapon-free zone
NPG	Nuclear Planning Group (of NATO)
NPT	1968 Nuclear Non-Proliferation Treaty
NSA	Negative security assurance (relating to non-use of nuclear weapons)
SALT	Strategic Arms Limitation Talks
SLBM	Submarine-launched ballistic missile
SSBN	Nuclear-powered ballistic-missile-launching submarine
START	Strategic Arms Reduction Talks
WMD	Weapons of mass destruction

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Introduction

I worked in the defence field for nearly thirty years of my thirty-eight as a United Kingdom civil servant. Policy on nuclear weapons bulked large in several of my posts, and I acquired over time a structure of concepts for tackling the issues it raised. I wrote fairly often, especially in the early 1980s, about one or another component of the structure—for lectures or seminars, for interchange with others interested, for clarifying ideas to myself, and occasionally for publication though serving United Kingdom officials are much constrained). I have not however hitherto assembled the components in a single presentation. I do so now partly because the content may be of some historical interest, but primarily because the need for policy-makers to think hard and realistically about nuclear weapons does not end with the Cold War. The issues have not now the urgent force they once had, and in several respects not the same specific form; but the basic ones arise irreversibly out of the nuclear discovery, not just the Cold War. Even if we were somehow to feel confident that the world will never again have to manage adversarial confrontation between superpowers, and even if the physical abolition of the armouries now existing were (and Chapter 4 of this account argues otherwise) a serious prospect within the time-frames with which practical policy has to deal, nuclear possibilities can never vanish entirely. Questions about whether the understanding first built up during the Cold War was or was not sound therefore remain relevant to shaping policy. Tackling them ought moreover to start, as much public comment at present does not,¹ from an accurate grasp of what that understanding actually was.

What is offered here is essentially an account of working concepts about what nuclear weapons mean for security policy. It is not directly concerned with political aspects, whether domestic or international, outside the security calculus. Chapter 1 sets out the basic transformation which nuclear weapons have imposed upon warfare between major developed states. Chapter 2 outlines the concept of deterrence for preventing the initiation of such warfare, and the doctrines for nuclear weapons which NATO progressively developed to help make deterrence work. Chapter 3 reviews the risks and costs of security policies involving nuclear weapons, and surveys some of the ideas—good and bad—put forward for managing those risks and costs. Chapter 4 suggests how we should approach nuclear-weapon issues in the altered world following the Cold War.

I built up my structure of ideas on these matters pragmatically, as a working apparatus, not by organised study with scholarly note taken of sources and references. The text is therefore not extensively equipped with indications of these. I acknowledge however a wide-ranging debt to all who have contributed, whether in official or in academic circles, to the storehouse of thinking from which I have drawn my conceptual stock. I am grateful in particular to Harold Brown, Lynn Davis, Beatrice Heuser, Peter Hudson, Michael Legge, Joseph Nye and John Weston for helpful suggestions as I worked on this text. Its shortcomings are mine alone.

I am deeply indebted to Barbara Mann for high secretarial skills, unfailing good humour and exemplary patience.

Notes

1. For a vivid example see the references to NATO nuclear doctrine in pp. 22-35 of the Report of the Canberra Commission on the Elimination of Nuclear Weapons, August 1996.

Chapter 1

The Nuclear Revolution

Evidence, Learning and Terminology

At one level understanding nuclear weapons is all too easy; their uniquely appalling power is plain. The development and evaluation of ideas about them however pose special problems, for a welcome reason: that we have little hard evidence about the political, strategic and military consequences of their use. We know a great deal about their physical working, and though there may remain (as was illustrated by disputes in the 1980s about the possibility of global 'nuclear winter' if large numbers were detonated) uncertainties which only disastrous events could finally resolve, we know a good deal also about their physical effects—most vividly and terribly from what happened at Hiroshima and Nagasaki. But the data on their use in war are confined to those two events in August 1945, when weapons were used conclusively by a nuclear possessor against a non-possessor.

It follows that almost all the enormous literature and the complex conceptual structures which have been built up about the use of nuclear weapons for preventing or conducting conflict are in a strict sense speculative. We have no further empirical data about how events may run if nuclear weapons are used, or if nuclear powers come seriously to blows with one another without such use. Even propositions about the achievement of nuclear weapons in deterrence lack hard evidence, since such propositions are essentially about alternative history—about what would have happened had matters been other than they were. The resulting limitations in our knowledge ought to instill in all who make predictive statements about these issues a degree of humility not always evident.

In the absence of data we have to rely upon concepts, hypotheses and inferences not directly or fully tested. There is by now a vast and diverse corpus of reasoning and conjecture about what factors may prevent or may cause nuclear war, and about how it might run if it ever started. Certainty is not available, especially across the huge range of possible situations; the causes, circumstances and course of nuclear war could vary widely, and it is a simplistic fallacy to talk as though it were a single undifferentiated phenomenon. But in matters so untested yet so important the temptation to hyperbole and over-assertion, whether for emphasis or to command attention, is very strong. Contrary opinions, imposingly argued or proclaimed, are to be found over the years on almost every issue, and any treatise of policy advocacy, whatever its direction, can therefore be richly garnished with selected supportive references of impressive-sounding authorship. It is moreover hard, especially for those lacking time or inclination to immerse themselves in the debates, to judge where wisdom lies. The concepts, though often complex ones which strain established frameworks of analysis, are not in themselves deeply inaccessible to the non-specialist, as in some branches of mathematics or science; but for that very reason it is difficult even to assess readily what constitutes expertise. No neatly-identifiable qualifications are available—neither senior military rank nor scientific distinction, for example, can claim presumptive authority except on limited technical points. There is no substitute for looking at the merits of what is said rather than the eminence of who said it.

All this is far from meaning that the writings are worthless or guesswork, that one opinion is as good as another, that we must despair of choosing between sound and unsound analysis and prescription, or that deep feeling and sincere abhorrence of nuclear weapons will suffice instead of hard thinking. The utterances of nuclear theorists may often be thought convoluted or remote, their content or expression repugnant, or their conclusions over-elaborate. But now that nuclear knowledge irrevocably exists there have to be policies about nuclear weapons, and those policies have to rest on concepts of some kind. It matters a great deal whether the concepts are sound or unsound, since the consequence of getting policies wrong could be unparalleled calamity.

We need therefore to think as clearly and realistically as the powers of the human mind allow. The strategic-studies effort worldwide in the past half-century represents in the round a massive intellectual achievement. We are perhaps fortunate that the early years of our nuclear learning took place when the horrors of world war were still vivid in memory, and when the weight and immediacy of the Cold War's ideological and geographical confrontation provided both a powerful simplifier of analysis and an acute sense of danger to discourage risk-taking or experiment. However that may be, the cumulative and shared understanding of nuclear issues among policy-makers and decision-takers progressively became far deeper, more sensitive and more secure than it had been in the late 1940s—or even in the 1960s, before collective effort in NATO's Nuclear Planning Group and US/Soviet dialogue in the SALT/START framework began to take root.

There is another health warning to be suggested. It concerns the vocabulary of discourse about nuclear weapons. Over the years there has grown up, as in almost any field of professional study, a large array of customary metaphors and terms of art. Both the metaphors and the terms of art carry risks to understanding. The metaphors are useful shorthand for referring to abstractions which simplify reality in order to aid thought and dialogue. But discourse may slip into reifying the abstractions—treating them as though they denoted specific phenomena with some sort of concrete existence outside the mind. Two examples are the 'nuclear threshold' and 'escalation'.

'Nuclear threshold' refers to the stage at which nuclear-country leaders (usually in the past taken to be NATO ones) losing in a major non-nuclear conflict are envisaged as facing the choice between using nuclear weapons and accepting defeat—a complex notion, yet the threshold' was occasionally alluded to as though one might almost stub one's toe on it. Risks of miscomprehension are perhaps highlighted by the adjective 'nuclear': comment has sometimes appeared to suppose that the location of the threshold is fixed mainly by the characteristics of nuclear armouries, whereas the prime determinant, as any proper grasp of the concept must show, would be the relative combat performance of non-nuclear forces.¹ 'Escalation' is a concept whose frequent misunderstanding or misrepresentation has an importance meriting the fuller treatment offered in pages 30-34. The point here is simply that it is shorthand for possible sequences of human choices, whereas it is often presented as though it refers to something approaching the inexorability of a chain-reaction in chemistry.

The risk with terms of art lies in the use of familiar words under conventions recognised by cognoscenti as referring to ideas narrower than, or otherwise different from, those that the words may convey to the lay reader. Four examples:

- i. In established nuclear discourse 'first use' means something quite different from 'first strike'. The former refers to the first occasion on which a nuclear weapon is used by either side in a conflict. The latter refers to a scenario in which one side mounts a pre-emptive operation—typically requiring the delivery of a large number of weapons—in the hope of destroying or much reducing the other's ability to retaliate.
- ii. In ordinary usage the word 'threat' has overtones of deliberate and menacing intent. In security discourse it may often—even usually—refer simply, and without judgement about intent, to a physical capability to do harm in the hands of a state regarded as conceivably an adversary.
- iii. 'Weapons of mass destruction' (WMD) is now generally accepted as a convenient shorthand for referring collectively to nuclear, biological and chemical weapons. There is no accompanying acceptance that 'mass destruction', in the sense of indiscriminate destruction of cities or populations on a huge scale, is the only way in which they could be used.
- iv. By semantically-arbitrary convention NATO air planning assigns the term 'strike' to nuclear action and 'attack' to conventional-weapon action.

Attempts to distinguish in some fixed conceptual way between the terms 'strategic' and 'tactical', whether applied to weapons and delivery systems or to targets, can be another source of confusion. Operational uses would not come neatly labelled, and the nuclear revolution has in any event changed the basic significance of the distinction. In arms control the dividing line, where needed, is a matter more for negotiation than for the application of pre-existing criteria; and in other contexts (such as arms inventories) the distinction is mostly useful only as nomenclature for a static classification of systems where measurable performance features such as maximum delivery range are laid down in advance as its basis.

In brief, thinking about nuclear weapons must be constantly on the alert—the more so in the absence of historical experience to anchor and calibrate discussion—to probe behind words and customary expressions so as to recall the underlying realities.

The Central Transformation

Much discussion of nuclear weapons, whether sympathetic or hostile to their possession, fails to comprehend deeply and clearly enough how they have transformed the whole idea of warfare. Unless this is understood, we slip too easily into applying concepts derived from 'classical' warfare but now no longer adequate or apt. In the field of astronomy the concepts of Ptolemy, long predominant, postulated a central Earth round which other bodies, including the Sun, revolved; and accounting for observable facts required more and more convoluted explanatory hypotheses. Copernicus however conceived a new thesis of great simplifying and clarifying power: that the Earth revolved round the Sun. Once this was grasped, much that had seemed perplexing now fell into place. A good deal of nuclear commentary, some of it from distinguished figures, has remained of Ptolemaic character. We need to grasp the nuclear equivalent of the Copernican insight.

Before 1945 advancing technology had long been heightening the destructiveness of warfare. The coming of nuclear weapons meant however a sudden and enormous leap, of a different order from that caused by, say, gunpowder or aircraft. It is not enough to view this as a ghastly intensification of the human horror of war. It did something fundamental at a colder level of analysis: it carried the potential of warfare past a boundary at which many previous concepts and categories of appraisal—both military and political—ceased to apply, or even to have meaning.

In the past the normal professional aim of military operations, at least in major war, has been so to damage or disrupt the enemy's forces that he either has none remaining effective (as with Hitler in 1945) or at least is denied—as would-be invaders of Britain were by the naval victories of 1588 and 1805—the means of bringing them to bear. In essence, military victory has customarily meant depriving the adversary of either the strength or the reach to land his blow. Now, however, the combination of nuclear explosive power with the worldwide delivery capability of modern missiles and the diversity and elusiveness of missile platforms, exploited by the resources of large highly-developed states, has made achievable what is for practical purposes infinite destructive power, unstoppable and inexhaustible at any humanly-relevant levels.

This may well reflect a development more fundamental than the effect of one especially dramatic scientific discovery. We mislead ourselves if we think of nuclear explosive power as just an appalling freak of nature, regrettably left around like a box of matches for the children to find. It is not merely conceivable but downright likely that if nature did not contain or we had not discovered this particular potential we would still before long, in the advance of our knowledge of the physical universe, have reached a capability for intolerable destructive force by some other route. Consider for example, even among technological possibilities visible today, what chemical or biological weapons might by now be capable of had they and their delivery systems received the same investment of resources, across half a

century, as nuclear armories have. From this standpoint nuclear weapons may be no more than the particular form first taken—perhaps to macabre advantage, in that its savage abruptness made the reality unmistakable-by an evolution that was anyway inexorable. The issues for strategy and statesmanship—and for ethics and law—need therefore to be recognised as not only novel but broad and basic. They concern how we are to live for the rest of human history (of which we may be relatively at the start) with what our technological mastery confers—the availability of virtually boundless capacity to harm one another.

In the light of this our thinking has to grapple afresh with what victory in war can now mean; with how nuclear weapons relate to the rest of the spectrum of possible force; and with what that relationship means for their handling in political and arms-control contexts.

A contest of strength between infinitely strong adversaries is a logical incoherence. Nuclear weapons have produced the *reductio ad absurdum*² of warfare in the traditional sense, so that former standards and categories of professional appraisal no longer suffice. Many of the paradoxes and dilemmas which beset thinking about nuclear weapons are no more than the reflection of this *reductio* as we hold it up to the light from various angles. If victory is taken to mean, as in the past, rendering the adversary incapable of doing further harm, it now becomes unattainable between large nuclear-capable adversaries, and the concept of using nuclear weapons to achieve it is indeed, as some senior military figures have commented, 'military nonsense'. But that merely casts into sharper relief what has always been one of the possible aims of military action (as von Clausewitz classically recognised) and has now to become, because alternatives have fallen away, the central aim, whether at the conventional or the nuclear level: that of operating upon the adversary's decision-making and resolve, and of doing so before we have suffered intolerable loss—inducing him, even though he still has the physical power to continue, nevertheless to step back, by convincing him that any previous assessment of net advantage to be found by going to or remaining at war was mistaken. The measure of victory then is how far the terms upon which the adversary is finally brought to cooperate in war-termination satisfy our key political aims, such as not surrendering sovereign territory. That is inevitably a narrower and less neatly assured concept of victory than the 'disarming' concept. It is however not a vacuous or pointless one; and no other is available. This is the Copernican reality.

The underlying fact is that nuclear weapons colossally extend the spectrum of possible force. As a result they cannot realistically be viewed and managed as though they were just aberrations within it like previous sorts of weapons seen as especially disagreeable, such as soft-nosed bullets or gas; they stretch it, as those did not, to near-infinity, and they thereby transform the significance of the whole. It has never been possible for war between states on issues where they perceive vital interests as engaged to work like a football match, a contest constrained by rules applied and sanctioned by some external authority. Escalation in war is far from certain, as pages 30-34 explain. But given the commitment nations bring to war, the passions a massive conventional conflict would have aroused, the hostility between opposing polities and the power of nuclear weapons to overtrump lesser weapons, we could never take it as sure—whatever might have been said beforehand—that losers would accept non-nuclear defeat in obedience to treaties, promises or international law. Even if all nuclear weapons had been scrapped, there could never be assurance that an embattled Hitler would go down to defeat without building some and using them, or that a Churchill or Roosevelt would risk letting him thus prevail rather than make counter-preparation.

Accordingly, though we can recognise subdivisions of the spectrum of force, and abstractions like thresholds and firebreaks can have a limited place in thinking about it, no conceptual boundary could be wholly dependable amid the stresses of major war. There is no way of segregating nuclear potential in a compartment impermeably sealed from other levels of conflict, no way of physically ensuring, as between states with the necessary resources, that conflicts which start at the bottom of the spectrum do

not end up at the top; the nuclear risk permeates all war between such states, whether or not particular weapons exist at the outset. We cannot dissolve the *reductio ad absurdum*; no sure path to re-rationalising major warfare is available, even if we somehow thought that desirable. And this truth—this revolution in military affairs—is not temporary or reversible, since the knowledge of how to make nuclear weapons can never be erased.

Notes

1. It used sometimes to be suggested that the forward deployment of nuclear delivery units on West German territory posed, in face of a postulated Warsaw Pact offensive, a 'use-or-lose' dilemma which, whether as inescapable fact or even as deliberate stratagem, could drive the timing of NATO nuclear action and so set the 'threshold'. This was, however, in no way part of NATO's doctrine or planning (and forward commanders had neither the authority nor, at least in later years, the physical power to launch nuclear weapons without political clearance).
2. I owe this key encapsulation to Andrew Edwards.

Chapter 2

Deterrence And Doctrine

The Concept of Deterrence

The basic concept of deterrence is a simple one: that of inducing someone to refrain from unwanted action by putting before him the prospect that taking it will prompt a response with disadvantages to him outweighing the advantages of the action. This concept has always had a part to play in the management of human relationships.

During the years after the Second World War the term 'deterrence' came however to special salience in the nuclear context, for a mix of reasons. The power of nuclear weapons conferred a uniquely enormous ability to display the prospect of disadvantage; and the deep distrust between East and West, resting at least in Western minds on perceptions of a massively-armed adversary of alien ideology and perhaps expansionist propensity, generated beliefs that intolerable actions might indeed sooner or later be taken unless this prospect was exploited to prevent them. More generally, the technological expansion of military capability exemplified by nuclear weapons convinced most people that the need to avoid war, rather than have to wage it, had acquired a new and special cogency. War to the maximum of physical capability could never again be viewed as just an inferior and unpleasant way of managing international affairs; it had ceased to be a way of managing them at all. The world faced both the necessity and the possibility—these being in effect two sides of one coin—of unmistakably convincing anyone, however unprincipled or sanguine, who might have been minded to initiate war with an advanced power on a crucial issue that doing so could not possibly yield net benefit.

This idea is not in itself hard to grasp. Teasing out its working amid the complexities of international affairs and in the frightening presence of nuclear weapons is however by no means straightforward, and the nuclear half-century has seen from time to time a considerable number of misconceptions about it.

In much security discourse the discussion of deterrence has rightly centred upon the huge reality of nuclear weapons. But it is a mistake to suppose either that preventing their use is the sole aim, or that they are the sole instrument, of deterrence. We need to prevent all major war, not just nuclear war, between advanced states. There are two reasons for that. Firstly, the terrible events of August 1945 did not mean that war suddenly became nasty after having been nice. It had not previously been nice. The carnage of the trenches in the First World War is not to be forgotten; and the Second World War took, directly or indirectly, something like fifty million lives before Hiroshima and Nagasaki were struck. The cosy-sounding adjective 'conventional' for classes of weapon like those of the Second World War and their still-more-potent modern successors should not mislead.

Secondly, non-nuclear war is not just appalling in itself. It is also the likeliest route to nuclear war—in practice indeed the only likely route, since scenarios of the holocaust being launched by accident or through technical malfunction are absurdly far-fetched (as pages 36-38 explain). The risk would be at its highest when bitter conflict had already broken out at a lower level. War-prevention needs therefore to operate upon all levels of military conflict between nuclear-capable states.

Partly on that account, deterrence cannot operate only by means of nuclear weapons. For reasons touched upon later their use can scarcely be credible, and their deterrent power therefore scarcely effective, against aggression at much lower levels of force. Military capability is moreover, as already noted, a continuum within which there can ultimately be no guaranteed firebreaks. Its effect whether in war or in deterrence works (or fails to) as a package, not a stack of sealed boxes; a combatant failing to get his way at one level would always be able to consider his options at another. The various levels of military force are therefore complementary and interdependent; all contribute to deterrence. It is worth

noting also that the interaction of various levels in overall deterrence may helpfully ease the weight that would fall on some of them if taken in isolation. As both strategy and force dispositions illustrated, the overshadowing nuclear component made it unnecessary for NATO during the Cold War to pursue the goal of assured parity or adequacy at non-nuclear levels (whether 'conventional' or other, such as chemical). Without nuclear weapons that goal—which can be more elusive, more unstable and more costly—returns to centre-stage.

Much misunderstanding has formed around the relationship between deterrent possession of nuclear weapons and their use. At one edge of the debate some have attempted—perhaps in the search for a way past uncomfortable political or ethical questions—to establish a complete disjuncture between possession and use, claiming that the former need carry no implication at all about the latter. At the other edge lie suggestions that deterrent possession must entail a fixed and implacable—almost an automatic—disposition to press the launch button given grounds for doing so. The truth is more complex than either of these extremes.

There is clearly some force in the notion of 'existential'¹ deterrence, taken as meaning that if a potential adversary possesses a substantial nuclear armoury this is bound to make us cautious in normal circumstances about gravely provoking him, whatever he may or may not have said (or we may know or think we know) about his intentions for its use. We cannot however infer from this that our own armoury will be durably effective in contributing to deterrence, especially in times of pressure when it is most needed, if there are no realistic concepts for its use² or if we have a settled resolve never to use it. This is so for both logical and pragmatic reasons.

Deterrence and use can in logic be distinguished, but not wholly disconnected. We cannot say that nuclear weapons are for deterrence and never for use, however remote we judge the latter possibility to be. Weapons deter by the possibility of their use, and by no other route; the distinction sometimes attempted between deterrent capabilities and war-fighting capabilities has in a strict sense no meaningful basis (unless war-fighting is misequated with classical war-winning—see pages 22-24). The concept of deterrence accordingly cannot exist solely in the present—it inevitably contains a reference forward to future action, however contingent. The-reference need not entail automaticity, or even firm intention linked to defined hypotheses; it need entail no more than a refusal to rule out all possibility of use; but it cannot entail less.

The pragmatic reasons why purely 'existential' deterrence will not serve are of two kinds, both springing from the fact that an operational nuclear armoury is not an inert pile of materiel but has to involve a large number of people. Firstly, it is unrealistic to suppose that a firm intention never to use, and the lack of any plans for use, could be permanently and dependably concealed from an adversary; yet if he perceives them the deterrent force of the armoury is hugely diminished if not indeed destroyed. Secondly, it cannot reasonably be supposed that the commitment of thousands of individuals—often in very demanding tasks—could be durably sustained in the known absence of planning which they could regard as seriously intended. In brief, and whatever the ultimate decision-taker may envisage in the privacy of his own thinking, a structure of deterrence cannot be built upon a state policy of absolute non-use, or without genuine concepts of possible use.

These facts can be entirely compatible with a deep and sincere belief by a nuclear possessor that the need to use the weapons would be a disaster, that the option of simply not using them in the event must always be recognised, and that the crucial aim of possessing them must be to help prevent any circumstances from arising which might leave their use as the least bad option available. But there lies at the heart of deterrence in the nuclear age an inescapable paradox: the more seriously the possessor is believed capable in extremis of using the armoury, the less likely it is that others will allow circumstances to arise challenging its use. And the converse is also true.

The point goes beyond the matter of basic refusal to exclude use. Especially though not only in the particular setting of the Cold War confrontation, plans and capabilities have had to provide options for use that could be credible; and this has meant, for example, developing weapons of greater accuracy and lower yield, and plans for more limited use and more constrained targeting, than might feature in an uncontrolled apocalyptic holocaust. The development of such weapons and plans was intermittently criticised in the West as implying that nuclear warfare was thought probable, or as betokening a dangerously-increased propensity to regard it as a tolerable enterprise. But such criticisms failed to recognise the inevitability of the paradox. Ultimately, accepting them would lead towards less credible deterrence and thus more, not less, risk of war. The evident possession of practical options is directed entirely to making war as remote an eventuality as possible.

Deterrence is a concept for operating upon the thinking of others. It therefore entails some basic presuppositions about that thinking. In the nuclear context critics have sometimes maintained that these presuppositions must impute to adversaries very sophisticated rationality, or deep malevolence, or both; and that the first imputation might well be precarious and the second unfounded. But deterrence does not depend upon either. As to the first, though constructing an effective deterrence system involving nuclear weapons is in some respects a complex affair, recognising its message once it is credibly in place requires no more than simple rationality. Only a state ruler possessed by a reckless lunacy scarcely paralleled even in pre-nuclear history would contemplate with equanimity initiating a conflict that seemed likely to bring nuclear weapons down upon his country. As to the second, a policy of deterrence does not assume the presence of a profoundly evil adversary continuously resolved upon striking massively the moment guard is lowered. It is preferably directed on a long-run basis at closing off hostile options, obviating temptations before they can be seriously felt, and fostering a mindset which even in sharply adversarial situations does not entertain military aggression as a possible course of action. To judge that nuclear weapons probably played a part in the remarkable maintenance of peace through over forty years of East-West confrontation, with many potentially-inflammable interfaces, does not have to postulate that the Soviet Union harboured a constant formed intent otherwise to embark upon sweeping conquest. It rests on a sense that had conflict not been so manifestly intolerable the ebb and flow of frictions might have been managed with less caution, and a slide sooner or later into war, on the patterns of 1914 and 1939, might have been less unlikely.

Another occasional criticism argued that deterrence in the nuclear setting could not ultimately be credible because no possessor could hope to be better off after a nuclear conflict than before it, or because in some situations (as for example if a medium-sized state like France or Britain confronted a massive one like the Soviet Union) the former might suffer proportionately more than the latter in any substantial exchange. But such arguments mistake what is the crucial calculation. Harm likely to be suffered by would-be deterrer A is of course not immaterial in the structure of deterrence, since it will bear upon the to-be-deterred B's assessment of A's resolve. The key calculation to be made, the key comparison which deterrence seeks to impose, is however between how B fares if he embarks on aggression and how he fares if he does not. A's assessments of his own prospects (whether before-and-after comparison or, more appropriately, between the alternative outcomes of resistance and surrender—the United Kingdom, clearly among the victors in the Second World War, was scarcely better off in 1945 than in 1939) are strictly secondary.

The calculation to be placed before a potential adversary also involves the dimension of certainty and uncertainty. Here too there is risk of conceptual confusion. Certainty (or its absence) can have two main aspects. The first concerns whether or not there will be a determined response to aggression; the second concerns what form the response may take.

Effective deterrence does not absolutely require full certainty in either aspect. Even a modest possibility of an appalling penalty may well generate enough 'expected disbenefit' in a potential adversary's

calculation either to constitute a total bar to his aggression or to outweigh its 'expected value' (that is, the benefits of success factored with the probability of achieving it). That said, there is real risk to deterrence if the first type of certainty—on whether there will be a determined response—is over-diluted. For this reason effective deterrence has a crucial political component, not always sufficiently recognised. Good fences, the saying has it, make good neighbours. If deterrence is to work well—especially under stress, when it may matter most—there needs to have been established beforehand, whether by declaration or (better) by consistently-sustained political conduct, a clear message about where limits lie and what will be viewed as unacceptable. The behaviour of the West plainly built up such a message in respect of West Berlin, and later of the Gulf following the Soviet invasion of Afghanistan. The most conspicuous failures of deterrence in recent decades have arisen not from lack of corrective military power or insufficient communication of its existence, but from failure—as over the missile deployment in Cuba, and the attempted annexations of the Falklands and Kuwait—to instill firmly and in good time an accurate understanding of what would be regarded as politically intolerable.

Certainty about the precise form that a resolute response will take is a different matter. The strongest possible deterrence is no doubt achieved when the actor to be deterred can be presented unmistakably with the assurance of a defined penalty of overwhelming severity. As however NATO's rapid drawing-back from tripwire-like strategic doctrines illustrated, that assurance is in many settings not credibly achievable. The best fallback then becomes a deterrent posture which so far as possible conveys that there will certainly be an effective response but prevents an adversary from calculating confidently (and so being better able to head off, pre-empt or discount) exactly what it will be, and in particular from counting on its excluding ultimate recourse to massive force if intolerable aggression is maintained.

The concept of intolerability may serve as a reminder of another fallacy about deterrence, more persistent than most. This is the claim³ (from which radical deductions for policy are often then drawn) that nuclear weapons can deter nothing save other nuclear weapons. This claim seeks to impose upon the spectrum of military force a rigidly-segmented structure which, as noted on pages 10-11, ignores the passionate realities of major war. But the point can be illustrated less abstractly. 'Nuclear deters only nuclear' has to hold that the existence of nuclear weapons played no part whatever in the striking fact that across four confrontational decades the Cold War adversaries so managed their numerous differences that they never came to military conflict at all. More specifically, it has to hold that Western possession of nuclear weapons could have had no impact upon the Soviet Union's assessment (for example at the time of the 1962 Cuba crisis) of its options in relation to West Berlin, which it could always have overrun by non-nuclear force; that if governments implacably opposed to Israel's existence came to power among her neighbours and successfully made common military cause in aggression, they could and would feel confident that Israel would accept political obliteration by conventional or chemical force rather than exercise the nuclear option; more concretely still, that Israel's known if unstated nuclear capability not only did not play but could not have played any part in Saddam Hussein's decision not to use his chemical weapons against Israel as an assured means of triggering the patience-exhausted Israeli intervention which he deeply desired to engineer in the 1991 Gulf War. And further such scenarios can easily be imagined elsewhere, even within the limits of the world's political configurations visible to us today.

A senior colleague⁴ once commented to me that a nuclear state is a state that no-one can afford to make desperate. That is true and to the point. The political, moral and psychological barriers to any use of nuclear weapons are unquestionably (and healthily) very high, especially after half a century of non-use. But while attack by nuclear weapons would certainly be one way of rendering a nuclear state desperate, it is absurdly narrow to suppose that nothing else could, and moreover that other states could safely base deeply hostile actions upon that supposition.

NATO Nuclear Doctrine

The most thoroughly-debated and explicitly-presented official doctrines about the role of nuclear weapons in preventing and managing war are those developed in the NATO context. They therefore continue to merit special attention, even after the end of the Cold War which first prompted them, as being the leading public-policy product of the world's first half-century in thinking through the impact of the irreversible nuclear revolution upon the idea of war. Their original specific environment has faded away, but it would be foolishly shallow to assume on that account that nothing in them can be of practical relevance for the future.

The key features of mature NATO nuclear doctrine took shape during an extended evolution stretching from the Alliance's inception in 1949 until the 1980's. Both the long time and the laborious effort this absorbed reflected in part the learning processes which the nuclear revolution imposed on everyone concerned with security issues. They also however reflected special features of the NATO situation.

First, doctrine had to command the overt support or at least acquiescence of many nations of different sizes and capabilities, with different histories and therefore different attitudes to defence and the use of armed force, and with different patterns of public opinion. Second, it had to accommodate the natural divergence of national perspective between those living close to the Soviet Union's massive power and those separated from it by broad oceans and so threatened far less directly, if at all, by anything other than nuclear weapons. Third, it had to manage the awkward fact that the Alliance's own nuclear capability lay overwhelmingly in the hands of a member of the latter and not the former group. Fourth, the evolution of Alliance doctrine was from the late 1960's onwards essentially in the hands of a systematic and active collective mechanism, the Nuclear Planning Group. This combination of features complicated the task of forming doctrine, but at the same time meant that it was tested by study, debate and challenge giving the outcome not only political acceptance but also an intellectual solidity and sensitivity which an easier and less collaborative genesis would scarcely have ensured.

The doctrine was built around the Alliance's strategic concept of flexible response, formulated during the 1960s. That concept has been much misunderstood and even caricatured. It did not, for example, envisage a pre-determined sequence of moves—an 'escalation ladder'—to be followed in the face of aggression; and though it did not rule out first use or early use of nuclear weapons, it was far from prescribing or assuming either. The core of the concept was always the timely use of the minimum force, whether conventional or nuclear, adequate to deny an aggressor success in his objective. Aggression against so broad and diverse an entity as the North Atlantic Alliance could have a wide variety of forms and scales; and providing a capability for apt and credible application of minimum effective force to fit any scenario therefore meant that there had to be plainly available a substantial range of military options from which the Alliance could choose both for initial resistance and for how best to proceed if the first option did not succeed. A narrow set of prescriptions for response, or a rigid doctrine for the order or number of follow-on options to be entertained, would have been the antithesis of flexibility, at odds both with the realities of the Alliance's political, geographical and strategic diversity and with the deterrent merit of uncertainty.

NATO thinking was always clear that a major conflict was not to be conducted in sealed compartments, whether of territory or of force category, and still less in sealed compartments imposed by an aggressor to suit his strengths and preferences. The idea of possible escalation, in the sense of being ready to change the terms of the encounter in scope or intensity beyond what the aggressor had chosen, was essential. But NATO recognised also that the prospect of having abruptly to cross a wide gulf in these respects could scarcely be either acceptable to its own peoples or credible to a determined adversary. Deterrence required making it as hard as possible for any adversary to form the view that NATO would shrink from decisions on raising the conflict's intensity, or to dare act on such a view. The range of options available

must therefore be an unmistakable continuum without huge gaps. That in turn meant that there had to be nuclear forces, backed by will and doctrine for their possible use, intermediate between conventional forces (NATO had no large offensive chemical armoury) and the ultimate strategic nuclear capability—the more so since, especially in earlier days, that capability often entailed high weapon yield, low accuracy and uncertain penetrativity, so that precisely-limited use might not have been easy.

From NATO's inception the judgement was widely accepted that NATO's non-nuclear forces might find themselves unable to repel or even arrest a large-scale and determined attack upon NATO territory. The complexities and uncertainties of military conflict have often confounded predictions about its course, but this judgement seemed a prudent inference from the political characteristics and military capabilities of the Soviet Union and its bloc; from the strategic geography of the East-West confrontation; and from the fact that NATO, as a grouping of free sovereign states, could not espouse plans envisaging the ready surrender of any member's territory and must therefore adopt a posture—'forward defence'—that was by no means optimal for military effectiveness. Though occasional opinion was to be heard that the judgement was by no means overwhelmingly probable (or that reasonably feasible steps could be taken to make it much less so) it could scarcely be contested that the Alliance's construction of military response options must at least reckon with the possibility that it might in the event turn out to be right. In brief, therefore, the Alliance had to think hard about what it could do if aggression seemed set to succeed at the conventional (or chemical) level. The only available options, surrender apart, plainly had to envisage the use of nuclear weapons.

Reflection, analysis and discussion however brought home the difficulty of devising such options in any form likely to bring dependable benefit in classical military terms. Besides the overwhelming general fact of virtually inexhaustible destructive power in the hands of the postulated adversary, substantial studies of possible scenarios brought out—in retrospect, unsurprisingly—a more particular conclusion: that if, finding itself losing in a conventional conflict in Europe, NATO were to use nuclear weapons for military effect and the adversary then responded more or less symmetrically, it must be expected (with all due allowance for the uncertainty in such evaluations) that NATO would still, save perhaps in one or two narrowly specialised settings,⁵ find itself losing. In other words, NATO could not count on its nuclear weapons to substitute military victory for military defeat. Recognition of this conclusion infused the work of the NPG for most of the later years of the Cold War.

It did not follow, however, that NATO's nuclear weapons could have no value in averting the consequences of prospective defeat at lower levels of force. The studies simply cast into sharper relief the underlying truth of the nuclear revolution (pages 9-10). NATO nuclear doctrine had to concentrate upon the use of weapons to convey effectively to the adversary the message that he had mistaken NATO's political tolerance and underrated NATO's will to resist, and that for his own survival he must therefore back off. As we have seen, imparting that message is (short of the ultimate strike, on which the NPG mostly did not focus, although military planning catered for the use of NATO-declared forces at that stage) the only use of nuclear weapons that is rationally available, whether in NATO's particular situation or in any other confrontation between substantial nuclear powers. It is moreover basically as true (see pages 51-52) of second as of first nuclear use.

Much NPG work centred upon questions of targeting principle (it did not attempt detailed target selection) to fulfil this basic war-termination concept. The purpose would inherently be to convey a political message and induce a political response; but it was generally accepted that achieving this would require action with some substantial material effect going beyond just the shock, severe though that might be in first use, inherent in any nuclear action. 'No-target' demonstration—the detonation of a weapon over the Baltic, say—was occasionally canvassed, and the option continued to be recognised; but it found little real support. It was judged, surely rightly, that this might well suggest precisely a lack of the tough resolve that it would be the whole aim of the action to demonstrate.

The characteristics of the action to be taken would have to be judged—inescapably amid uncertainty, and with vivid risk in a situation of great tension—along several dimensions, such as the number of nuclear strikes, their yield, the particular targets chosen, the likely scale of collateral damage and the nature and origin of the delivery system to be used. The heart of the judgement required would be to find the right balance between doing too little to drive home the message and doing so much as to provoke a ferocious reaction in rage or spasm. No neat formulae were or could have been found, but there was progressively established a salutary checklist of factors to be weighed, and some particular considerations were underscored. It was usually thought that for most situations targets should preferably, though not with absolute necessity, be military ones with some bearing upon the non-nuclear operations in progress,⁶ so that the aggressor could not immediately sustain those operations unchecked but would be compelled at least to pause and address fresh and dangerous decisions. Tensions—again inherently unresolvable in any tidy or definitive manner amid the Alliance's complexities—were regularly apparent between the grave objections to choosing targets within overrun NATO territory (or, to a lesser extent, non-Soviet Warsaw Pact territory) and the perceived retaliation-provoking dangers of choosing targets within the Soviet Union itself. During the latter years of NPG work the former consideration rightly came to bulk increasingly large. But there was of course, even if targeting were to embrace Soviet territory, no suggestion that it should or could sensibly be directed to eliminating Soviet ability to strike back; the capability for 'mutual assured destruction'—a fact of life, not a strategy—was not challenged.

Some argument has sprung up about whether or not NATO doctrine did, or should in future, envisage the use of nuclear weapons only as a 'last resort'. This debate seems artificial; it is by no means clear that differences of substance need underlie it. NATO has always viewed the use of nuclear weapons as a last resort, in the sense that so grave a step would be taken only if no other course was judged likely to meet the need—that is, to avert defeat. In a developing conflict that juncture might, if it came at all, come quickly, or it might come slowly. The appropriate sense of 'last' is not primarily a temporal one, implying that every other conceivable option has first been extensively tried out almost irrespective of practical judgement about its success chances,⁷ but rather 'least to be preferred'. German colleagues in the NPG framework were wont to cite an aphorism 'as late as possible, as early as necessary'. That captures the essence.

In a wholly tidy and logical world nuclear armories, like any others, would be developed, configured and sized to fit previously-agreed doctrines of possible use. But for both good and bad reasons military planning is not often exactly like that. At least by the 1970s there seemed a wide mismatch between the doctrines outlined above and the peak inventory of over 7000 United States warheads, on a wide range of delivery vehicles owned and operated by various Alliance members, which had been built up in Europe during the 1950s and 1960s. Thereafter however NATO found little difficulty (other than sometimes from the temporary tactical constraints imposed by arms-control negotiations—see page 46) in making a series of substantial reductions. There can be no doubt that an ample range of options to fulfil the doctrines of possible use evolved by the NPG did not need anything like 7000 warheads, even granted that the practicalities of military logistics and operations mean that planning for a dependable capability to mount up to some possible total number of strikes, in diverse scenarios, will normally require an inventory of far more than that total.

The reduction in numbers was matched—in some instances indeed preceded—by a reduction in the number of categories of nuclear weapons. At one time or another the United States possessed nuclear weapons for forward-infantry use, for artillery use at various ranges, for air-to-air use, for surface-to-air use, as land-mines, as depth-charges and in anti-submarine torpedoes, in addition to missiles or aircraft-delivered weapons for striking targets well behind the front line and back into Soviet territory itself. The progressive pruning of these categories reflected several influences—the political difficulty that certain of

them could scarcely be used other than on or over friendly territory; the increasingly-evident fact that some belonged to the 'military-war-winning' aspiration which NATO had recognised as unreal; and the fact that advances in target-acquisition and similar technologies progressively reduced any case for using nuclear explosive power to compensate for poor accuracy.

There remained nevertheless other considerations which meant that the characteristics of the armoury as a whole could not be determined exclusively by the scale, nature and location of the targets to be put under threat. One such consideration held that non-strategic war-termination strike (or 'pre-strategic' or 'tactical' or 'theatre' strike—the terminology never quite settled upon a uniformly-accepted usage differentiating among these) ought to be carried out by delivery systems evidently separate from the 'strategic' ones—typically, those embraced by the SALT and START negotiations—which were seen as posing the ultimate threat of massive attack upon the Soviet heartland. The argument ran that unless this distinction was maintained the Soviet leaders might mistakenly interpret the action as just the initial salvo in that ultimate assault and might accordingly rush calamitously, perhaps on 'use-or-lose' grounds, to launch their own full-scale power. The weight of this argument always however seemed questionable. NATO would undoubtedly accompany any 'war-termination' nuclear action by a major effort in explicit communication to convey what its purpose was and was not—this was indeed a major theme of study in the NPG's work. The Soviet leaders would surely (as would NATO ones were the situation reversed) judge the action by the reality of how many and which targets were hit, not by the nature of the delivery system; they would know that the final exchange meant their own country's utter ruin, and would recognise the appalling dangers of precipitating it rashly or needlessly. They would know also that the scale and character of their own huge and diverse armoury meant that they need not fear being preemptively disarmed. (All this applies a fortiori to hypotheses of the accidental or unauthorised launch of a few weapons; as pages 36-38 note, even if these had a higher probability than the very remote one which decades of experience suggest, the notion that they might precipitate cosmic holocaust through wild recklessness or near-automaticity in decision-making belongs to science fiction.)

There were however, in this non-technical category, further limiting considerations of greater weight. The collective nature of the Alliance meant that there was significant value in having other members share with the United States the political, material and moral burdens of nuclear effort and acquire a correspondingly-enhanced right to influence policy. In practice the most substantial route available for achieving this, given that the United States must retain direct control of its nuclear warheads, was to involve as many allies as was politically possible in the provision and operation of Europe-based delivery systems for which planning envisaged a genuine role. To have assigned nuclear-strike responsibilities exclusively to 'off-shore' systems, however numerous, capable and invulnerable, would have neglected this important dimension. It was also conjectured, rather more debatably but not trivially, that Soviet leaders might attach an extra degree of credibility, in the scenario of a massive assault by them upon Western Europe, to the likelihood that NATO nuclear systems based there and operated in part by West Europeans would actually be used.

As this last point illustrates, the usability of weapons, as judged likely to appear to the adversary, was constantly and properly in the minds of NPG participants. Almost inevitably, the idea sometimes gave rise to difficulties in public presentation. Critics of NATO policies were wont to assert that planned usability betokened a positive propensity to use, and indicated a mindset disposed to regard the waging of nuclear war as in some ordinary sense acceptable. But as page 16 has noted, argumentation of this sort misunderstands the working of deterrence; it would, if pushed to its logical conclusion, lead to an armoury of much lower credibility, to more precarious deterrence and so to greater risk of war, including ultimately nuclear war. The tensions in public understanding were nevertheless substantial, as was shown by their sharpest manifestation when in the late 1970's a gross mishap in initial presentation—encapsulated in the misleading term 'neutron bomb'—prevented the deployment of enhanced-radiation

weapons of which the positive merits in deterrence logic (even if their importance may have been overrated) were scarcely disputable.⁸

That episode may prompt in retrospect a more general reflection. As I look back from the comparative comfort of the 1990s, I would be ready to recognise that in the pursuit of ideal logic and maximum assurance some aspects of NATO nuclear planning may have slipped into over-elaboration and over-insurance, insufficiently recognising (in company with many and various opponents of NATO and its dispositions) the robustness which the huge reality of nuclear weapons conferred upon war-prevention even without extreme refinement. In Windsor, near London, there is a fine town hall with a pillared portico designed by the great architect Sir Christopher Wren. It is recounted that when he first submitted his plans the town corporation complained that there were not enough pillars holding up the portico roof. Under protest, he added extra ones; but he made his point, visible to this day, by arranging that the added pillars stop a few inches short of the roof. It may be that some components of NATO deterrent planning and force provision were Corporation pillars rather than Wren ones. But it cannot be doubted that the roof needed pillars; and that it was safer with too many than with too few.

Notes

1. This term was used by McGeorge Bundy in a notable article in *Foreign Affairs*, Vol. 48 No 1, October 1969.
2. These concepts do not have to extend to detailed targeting plans against specific adversaries. Especially after the Cold War, a stance of general deterrence addressed simply 'To whom it may concern' may be entirely appropriate (that is after all the basis on which most countries maintain armed forces). But such a stance is different from a policy of absolutely renouncing use.
3. See for example Canberra Commission Report, pp. 9-10.
4. Sir Hermann Bondi, Chief Scientific Adviser to the Ministry of Defence 1971-77; Master of Churchill College, Cambridge, 1983-90.
5. One such scenario, for example, was an amphibious assault upon Jutland—a well-timed nuclear strike could in theory have left the aggressor without enough sea-lift to continue in the same mode.
6. Misunderstanding of this concept perhaps contributed, at least indirectly, to the recurrent complaint that NATO concepts amounted to a 'war-fighting' doctrine directed foolishly to seeking military victory. But mature NATO targeting concepts were 'war-fighting' ones only in the very limited sense, sharply distanced from classical 'war-winning', that is indicated here.
7. This misapplication of the 'last-resort' idea—an important concept within just-war theory—was also to be heard in debates during the run-up to the 1991 Gulf War.
8. Nuclear explosions (all of which must involve the action of neutrons) produce energy in three main forms—blast, heat and radiation. Warhead design can modify the relative proportions of these. Against heavily-armoured targets like tanks (in which the Soviet Union had huge numerical preponderance) the key destructive output is radiation, attacking the crews. In a 'standard' warhead its radius of effect is the shortest of the three, so that heat and blast reach wider than the direct military purpose would require in attack on armoured forces. An enhanced-radiation weapon is one designed to provide, within a given total energy output, more radiation effect and less unwanted (collaterally-damaging, whether to friendly forces or to non-combatants) blast and heat.

CHAPTER 3

RISKS, COSTS AND THEIR MANAGEMENT

Escalation, Stability, Accident, Proliferation

Escalation

The term 'escalation' refers to the familiar general fact that in situations of competition or conflict actions by one side are apt to induce reactions by the other in order to recover advantage or redress disadvantage, and that in war this process may progressively raise the intensity of fighting. But the new particular fact that the nuclear discovery has stretched out the continuum of possible force to the extreme of destructive apocalypse has given the idea of escalation a special importance. Escalation of course starts when fighting starts, not just when nuclear fighting starts. The customary focus of concern however has been primarily upon what may happen if nuclear weapons begin to be used—is retaliation certain? and could the process be halted short of all-out nuclear war?

Two points about these questions should be recognised at the outset. The first is that we do not know the answers for sure; and anyone who asserts or implies that we can be sure or nearly sure cannot be on firm ground. Nor can we measure the probabilities neatly. No one knows how political leaders and armed forces will react in the unprecedented situations in question. Escalation is not a physical process like a chemical chain reaction, or a set of random events like outcomes on a gambling machine; it involves interactive choices by people. It has to be considered therefore in human and political terms, not just as a matter of military or technical mechanics. The second point is that the eventuality could arise in a wide variety of ways and settings. Assertions claiming uniform predictive authority throughout the range of possibility are very unlikely to be well-founded; and so, a fortiori, are deductions and evaluations purporting to rest on them.

There are good reasons for fearing escalation: the confusion of war; its stresses, anger, hatred, and the desire for revenge; reluctance to accept the humiliation of backing down; perhaps the temptation to get further blows in first. Given all this, the risks of escalation—which Western leaders were rightly wont to emphasise in the interests of deterrence—are grave. But this is not to say that they are virtually certain, or even necessarily odds-on; still less that they are so for all the assorted circumstances in which the situation might arise, in a nuclear world to which past experience is only a limited guide. It is entirely possible, for example, that the initial use of nuclear weapons, breaching a barrier that has held since 1945, might so appall both sides in a conflict that they recognised an overwhelming common interest in composing their differences. The human pressures in that direction would be very great.

Even if initial nuclear use did not quickly end the fighting, the supposition of inexorable momentum in a developing exchange, with each side rushing to overreaction amid confusion and uncertainty, is implausible; it fails to consider what the decision-makers' situation would really be. Neither side could want escalation; both would be appalled at what was going on; both would be desperately looking for signs that the other was ready to call a halt; both, given the capacity for evasion or concealment which modern delivery systems can possess, could have in reserve ample forces invulnerable enough not to impose 'use or lose' pressures. As a result, neither could have any predisposition to suppose, in an ambiguous situation of enormous risk, that the right course when in doubt was to go on copiously launching weapons. And none of this analysis rests on any presumption of highly subtle, pre-concerted or culture-specific rationality; the rationality required is plain and basic.

The argument is reinforced if we consider the possible reasoning of an adversary at a more dispassionate level. Any substantial nuclear armoury can inflict on an aggressor destruction outweighing any possible prize to be seized. A state attacking the possessor of such an armoury must therefore be doing so on a

judgement that the possessor would be found lacking in the will to use it. If the possessor used nuclear weapons (whether first or in response to the aggressor's own first use) this judgement would begin to look precarious. There must be at least a substantial possibility of the aggressor leaders' concluding that the initial judgement had been mistaken, that the risks were after all greater than whatever prize they had been seeking, and that for their own country's survival they must call off the aggression. Deterrence planning such as that of NATO has to be directed in the first place to preventing the initial misjudgement and in the second, if it be nevertheless made, to compelling such a reappraisal. The former aim has to have primacy, because it could not be guaranteed that the latter would work. But there is no ground for assuming in advance, for all possible scenarios, that the chance of its working must be negligible. An aggressor state would itself be at huge risk if war continued, as its decision-makers would know.

It may be argued that a policy which abandons hope of physically defeating the enemy and simply hopes to get him to desist is pure gamble, a matter of who blinks first; and that the political and moral nature of most likely aggressors, almost *ex hypothesi*, makes them the less apt to blink. One answer to this is to ask what is the alternative; it can only be surrender. But a more positive and encouraging answer lies in the fact that the criticism is posed in a political vacuum. Real-life conflict would have a political context. That which has concerned NATO is one of defending vital interests against a postulated aggressor whose own vital interests would not be engaged, or would be less engaged. Certainty is not possible, but a clear asymmetry of vital interest is a not-irrational basis for expecting an asymmetry, credible to both sides, of resolve in conflict. That places on statesmen, as page 18 has noted, the key task in deterrence of building up in advance a clear and shared grasp—plainly achieved in Cold-War Europe—of where limits lie. If vital interests have been defined in a way that is clear, and also clearly not incompatible with the adversary's, a credible basis has been laid for the likelihood of greater resolve in resistance.

It has also sometimes been suggested by critics that whatever might be indicated by theoretical discussion of political will and interests, the military mechanisms of nuclear warfare—particularly difficulties of communication and control—would drive escalation with overwhelming probability to the limit. But it is obscure why matters should be regarded as inevitably so for every possible level and setting of action. Even if the history of war suggested (as it scarcely does) that military decision-makers are mostly apt to work on the principle 'When in doubt, lash out,' the nuclear revolution creates an utterly new situation. The pervasive reality, plain throughout to both sides in conflict, is 'If this goes on to the end, we are all ruined.' Given that inexorable escalation would mean catastrophe for both, it would be perverse to suppose them permanently incapable of framing arrangements which avoid it. NATO, for example, has neither given nor envisaged giving its military commanders delegated authority to launch nuclear weapons without specific political direction; many types of weapon moreover have physical safeguards incorporated to reinforce organisational ones; and there have been multiple communication and control systems for passing information, orders and prohibitions. Such systems cannot be totally guaranteed against disruption if at a fairly intense level of strategic exchange (which is only one of many possible levels of conflict) an adversary thought it in his interest—it is by no means clear why he necessarily should—to weaken political control; even then, however, it has remained possible to operate on a general fail-safe presumption: no authorisation, no use. If arrangements in place be judged in some respects still not to meet these standards, the logical course is to improve them rather than to assume escalation to be certain and uncontrollable, with all that would flow from such an assumption.

The probability of escalation once war breaks out can never be one hundred per cent, and never zero. Where between those two extremes it might lie cannot be precisely calculable in advance; and even were it so, it would not be uniquely fixed—it would stand to vary hugely with circumstances. That there should be any risk at all of escalation to widespread nuclear war must be deeply disturbing, and decision-makers would always have to weigh it most anxiously. But a pair of key truths about it need to be

recognised. The first is that the risk of escalation to large-scale nuclear war is inescapably present in any significant armed conflict between nuclear-knowledgeable powers, whoever may have started the conflict and whoever may first have use any particular kind of weapon. The initiator of the conflict, if he meets effective resistance, will always have physically available to him options for applying more force. If the risk of escalation, irrespective of its degree of probability, is to be regarded as absolutely unacceptable, the necessary inference is that a state attacked by a substantial nuclear-knowledgeable power must forgo military resistance—it must surrender. But the companion truth is that the risk of escalation is an inescapable burden also upon the aggressor; and the exploitation of that burden is the crucial route for managing conflict to a tolerable outcome—the only route, indeed, intermediate between surrender and holocaust, and so the necessary basis for deterrence beforehand.

The working-out of plans to exploit escalation risk most effectively in deterring potential aggression can entail further and complex issues. It is for example plainly desirable, wherever geography, politics and available resources so permit without triggering arms races, to make provisions and dispositions that are likely to place the onus of making the bigger steps in escalation upon the aggressor who wishes to maintain his attack, rather than upon the defender. These issues are not further discussed here. But tackling them would have to start from acknowledgement that there are no certainties or absolutes available, no options guaranteed to be risk-free and cost-free; that deterrence is not possible without escalation risk; and that accordingly the fact of escalation risk can point to no automatic policy conclusion save for the outright pacifist.

Stability

Through most of the nuclear era it has been a concern increasingly shared on all sides that the structure of deterrence—the reciprocal cancellation of options for initiating war at any level between advances powers—should be stable. The stability needed has been of two main kinds, not always sufficiently distinguished. The first concerns efficacy in normal times—the best practicable assurance that events are not likely to imperil the deterrent balance by bringing the effective cancellation of options into question. The second concerns how to keep to a minimum the risk, if in time of crisis or conflict peace-time deterrence has failed or looks like doing so, that (as with mobilisation and transport schedules in Europe in 1914) operational, logistical or political features of the situation may work against taking decisions on adequate information and after proper consideration and time for communication, and so may increase whatever dangers may exist of precipitate misjudgement.

During the Cold War there were occasional surface perturbations, actual or threatened, of the military balance underpinning deterrence. The 1962 Soviet adventure in Cuba was an example, and different viewpoints might adduce others. But at no stage—at least after the Soviet Union's acquisition, by the late 1950s, of a substantial inter-continental delivery capability—was the ultimate cancellation of options at real risk. Military staff on either side could never even remotely have hoped (to borrow one commentator's¹ phrase) to brief their political leaders with a plausibly beneficial plan for initiating major attack even if, improbably, either might have been minded to wager national survival upon the accuracy and reliability of calculations and projections reaching far beyond any available experience.

It used occasionally to be suggested that the 'nuclear arms race' threatened the basic stability of the deterrent structure. As page 47 notes, the facts bear out the supposition of an arms race in only a limited (and declining) sense even during the Cold War. It is virtually impossible—and by no means universally or automatically desirable—to freeze technological advance; but to suppose that this automatically undermines stability is to confuse 'stable' with 'static'. Given the size, diversity and security of armouries and the prodigious destructive force they commanded, in terms of military calculus the margins of safety

within the Cold-War stand-off were enormous. To postulate that one bloc might outstrip the other decisively in nuclear capability, having regard to what 'decisively' would have had to mean in order to have practical utility for an aggressor, would have been like postulating that in an Olympic two-lap final one competitor might lap the rest of the field.

The needs of stability in time of crisis or conflict are of a different kind. What is then required of military forces and dispositions is that they should be so configured as to present to decision-makers on either side the minimum temptation or provocation to move swiftly to the use of force (or more force), whether to seize advantage or to forestall disadvantage, and the maximum incentive to hold back. The aim is that crucial decisions should to the greatest extent possible be made, even amid the confusion, stresses and damage of battle, in a measured way; by the top political authorities; and in the fullest possible understanding by each side of what the other is thinking and doing. All this of course is not peculiar to the nuclear age; but the nuclear reality poses—again, as two sides of one coin—a heightened imperative to achieve it and (because the incentive is both shared and compelling) heightened prospects of doing so, as is illustrated by much that was done during the Cold War by way of precaution, both unilaterally and through East/West agreement.

Accident

The safety of nuclear weapons needed to be, and at least in the Western setting consistently was, taken most seriously. Critics have nevertheless from time to time argued that the possibility of accident involving nuclear weapons is so substantial that it must weigh heavily in the entire evaluation of whether war-prevention structures entailing their existence should be tolerated. Two sorts of scenario are customarily in question. The first is that of a single grave event involving an unwanted nuclear explosion—a technical disaster at a storage site, for example, or the launch (accidental or unauthorised) of a delivery system with a nuclear warhead. The second is that of some event—perhaps such an explosion or launch, or some other mishap such as radar or computer malfunction—initiating a sequence that culminated in a nuclear exchange which no-one had truly intended.

No event that is physically possible can be said to be of absolutely zero probability (just as at an opposite extreme it is nonsensical to claim that nuclear-weapon use can be 'guaranteed'² to happen in the next half-century having not happened in the past one). But human affairs cannot be managed to the standard of either zero or total probability; we have to assess levels between those theoretical limits and weigh their reality and implications against other factors, in security planning as in everyday life.

There have certainly been, in over fifty years since the Second World War, many accidents involving nuclear weapons, from transporters skidding off roads to strategic bombers crashing with or losing the weapons they carried (in past days when such carriage was a frequent feature of readiness arrangements). A few of these accidents may have released into the nearby atmosphere highly toxic material. None however has entailed a nuclear explosion. Some commentators suggest that this reflects remarkable good fortune amid such massive activity and deployment over so long. A more rational deduction from the facts of this experience would however be that the probability of any accident's triggering a nuclear explosion is extremely low. It might be further noted that the mechanisms needed to set off such an explosion are highly complex; and that in a large number of ways the half-century has seen extensive improvements in safety arrangements. It is undoubtedly possible to see respects in which, after the Cold War, some of the factors bearing upon risk may be new or more adverse; but some are plainly less so. The half-century we have come through entirely without accidental explosion included early years in which knowledge was sketchier, weapon design less safety-oriented and precautions less developed than they later became, as well as years in which weapon numbers were larger, deployments more widespread and alert arrangements more tense.

Similar considerations apply to the hypothesis of war being mistakenly triggered by false alarm or misunderstanding. Critics again point to the fact, as it is understood, of numerous occasions when initial steps in alert sequences for US nuclear forces were embarked upon, or at least called for, by indicators mistaken or misinterpreted. In none of these instances, it is accepted, did matters get at all near to nuclear launch—more good fortune, the critics have suggested. But the rival and more logical inference from perhaps hundreds of events stretching over fifty years of experience presents itself once more: that the probability of initial misinterpretation leading far towards mistaken launch is hugely remote. Precisely because any nuclear-weapon possessor recognises the vast gravity of any launch, decision sequences have many steps, and human decision is repeatedly interposed as well as capping the sequences. (And even at the height of the Cold War no Western nuclear power had a launch-on-warning policy—that is, an intention to initiate nuclear retaliation on perceived evidence of impending rather than provenly-actual attack.) To convey that because an early step was prompted we somehow came close to accidental nuclear war is wild hyperbole. History anyway scarcely offers ready examples of major war started by accident (miscalculation is another matter, not at issue here) even before the nuclear revolution imposed an order-of-magnitude increase in caution.

Proliferation

From early in the nuclear age there was concern about proliferation (that term having become the established shorthand for the spread of nuclear-weapon ownership beyond existing possessors). The concern rested on both particular and general grounds. The particular concern was that new possessors, whether or not specifically identified, might import special dangers—they might be, or be thought to be, of uncertain motivation or of risk-taking propensity; disposed towards securing by force disruptive change in the international order; of an internal character not wholly trusted to maintain secure long-term control of an armoury and its materials; or involved in combustible regional confrontations. The broader concern has been simply a generalisation of all this—a fear that the more people had nuclear weapons the higher the risk that sooner or later something somewhere would go wrong and the weapons would be used.

A minority strand of counter-argument occasionally questioned these concerns. It typically suggested that the possession of nuclear weapons was a formidably sobering influence on possessors, so that wild behaviour was highly improbable; that the East/West nuclear stand-off had proved to be a stable conflict-preventing condition, and that there was no reason to expect markedly different effects and so to withhold this benefit from other confrontations; additionally or alternatively, that the spread of weapons to numerous new possessors was in the long run so inexorable that the global community would do better to concentrate on managing its consequences rather than fruitlessly lamenting its prospect. There may be some substance in elements of this commentary. Though the governments of most states have understandably (for repercussive reasons) preferred not to say so, it is in objective security terms by no means evident that, for example, the tacit quasi-nuclear stand-off between India and Pakistan amid their historic antipathies and alongside the Kashmir flashpoint is wholly to be deplored. In the round, however, worldwide opinion, both governmental and private, has overwhelmingly and rightly regarded the *laissez-faire* case as outweighed by the contrary arguments.

It has not always been easy for the international community, over the years, to evaluate the risks of proliferation and agree the priority and degree of urgency of counter-action alongside competing policy considerations such as the presumption of non-intervention in internal activities. Charges of hysteria at one end of the judgmental spectrum and complacency or inertia at the other have sometimes been freely traded. There are a few states whose character and behaviour are viewed internationally with such mistrust that others reasonably regard their acquisition of nuclear weapons as a development to be swiftly and robustly countered; but apart from these special instances the near-term consequences of particular events that might conceivably heighten the feasibility of proliferation can rarely be judged

calamitous in isolation. The prime case for a strong world-wide anti-proliferation strategy is of a broader character, resting on long-term uncertainty and chain-reaction dangers.

During the decades since the last open accession to the group of nuclear-weapon possessors (by China, in the early 1960s) there has been progressively assembled an array of measures—some on the supply and some on the demand side—to prevent or discourage further proliferation: legal agreements, international regimes to close off or limit the availability of materiel for weapons or delivery vehicles, security assurances through alliance or otherwise, economic and political incentive or pressure. None of these instruments on its own is a total bar to proliferation, and several could do with further development or wider application to strengthen the array as a whole. But in the aggregate, for all the imperfections, the effort has worked notably well, or at least much better than many sober-seeming warnings once suggested. Three decades ago it was commonplace to hear predictions of twenty, thirty or forty nuclear-weapon possessors at the end of the twentieth century. By that yardstick it is a striking success that there remain only the original 'official' five from the early 1960s together with three unacknowledged or 'threshold' possessors (Israel, India and Pakistan); that another unacknowledged possessor, South Africa, has discarded its capability; that the fragmentation of the Soviet Union has not increased the number; that the international community has cooperated in vigorous action to halt two break-outs (by Iraq and North Korea); and that major countries like Argentina and Brazil, once accounted among the likelier additions, have solidly renounced the possibility.

The keystone of the preventive barrier, though not its only component, has been the 1968 Nuclear Non-Proliferation Treaty. Its special feature has been the formal legitimation of the five open possessors alongside the intended prohibition of all others. From the outset of the Treaty's life this feature has been criticised as unfair, and as incompatible with any expectation that the Treaty regime will remain stable and effective. The Treaty, with an unparalleled number of ratifying states, has nevertheless endured through nearly thirty years and a succession of review conferences, the most recent of which has by consensus reaffirmed it without condition or time limit.

The criticism of unfairness nevertheless continues, and at the debating level it may seem formidable. Substantial considerations are however available in rebuttal. There is first an argument from realism. In the circumstances of the Cold War it would have been fantasy to expect (in particular, though not only) the two biggest possessors to abandon their armouries; and as pages 62-64 set out, that remains essentially if less manifestly true now. Given this reality, what non-nuclear nations have always had to ask themselves is whether they prefer a 'discriminatory' NPT or none. Overwhelmingly, they have continued to answer in favour of the former alternative. They have done so in their own interest—not as a favour to the nuclear powers, but as a benefit primarily conferred on one another: the NPT provides assurance that even amid possible stresses and strains they need not worry about or provide for local or regional nuclear-arms competition among themselves.

The NPT's recognition that all states are not necessarily equal for all purposes is moreover by no means without parallel in treaty or charter. The world is already accustomed, again as a matter of realism, to a structure that is formally 'discriminatory' in the security field—a Security Council with a small number of states having both permanent membership and special veto-wielding powers, within the Council. (This is not to argue that the present coincidence between the Security Council five and the NPT five is inherently necessary; it is indeed becoming positively undesirable.)

Criticism of the two-tier NPT typically asserts that the inequality is a standing incitement to proliferation. It is certainly a useful debating-point, and so of political and presentational comfort, for states which for their own reasons of perceived national interest wish to possess nuclear weapons; but it scarcely suffices to constitute on its own any large substantive element of such reasons. There is moreover an opposite side to the coin, at least as important. In some instances—including very crucial

ones, such as Germany and Japan—the possession of nuclear weapons by NPT legitimated allies committed to their security has been a key reassurance against their needing to seek nuclear capability of their own.

More generally, it is no way irrational for the great majority of non-nuclear countries to make the judgement (further discussed in Chapter 4) that in the world as it is, untidy and risky, the abolition of nuclear weapons is neither feasible nor necessarily desirable; and to conclude that in those circumstances it is safest, in the interest of all, to draw and maintain a limit of authorised possession around a small and well-established group of countries, including the country now most widely and practically involved in sustaining global stability and order.

One other NPT feature has served as a focus for criticism of the legitimated five. Article VI of the Treaty is regularly cited as enshrining disarmament commitments which the five have failed to discharge adequately. The criticism does not always focus accurately on what the terms of the commitments are:

'Each of the Parties to the Treaty undertakes to pursue negotiations in good faith relating to the cessation of the nuclear arms race at an early date and to nuclear disarmament, and on a treaty on general and complete disarmament under strict and effective international control.'

During the 1970s and into the 1980s the performance of the five in cessation of the 'arms race', even if the full aptness of that phrase might be contested, was at best unimpressive; but on any view there is no longer any such race. In the next respect—nuclear disarmament—the record of reduction during the Cold War was poor; again, however, the position is markedly different now for all of the five save China. Finally, the five can point to the evident coupling of the nuclear-related commitments with general and complete disarmament. No country can claim much achievement, or policy effort, in that aspirational regard.

All that said, the political thrust of Article VI is clearly towards sustained reduction in nuclear armories. Much has been done in that direction during the past decade, but there is scope to do more, as pages 68-71 suggest. Pursuing all that, in addition to its intrinsic merits of cost-reduction and inter-state confidence, will help further to reinforce acceptance of the Treaty regime and the efficacy of the anti-proliferation panoply as a whole.

Arms Control, Arms Races, Costs

Arms Control

Virtually from the start of the nuclear era there was a continual and proper concern, widely if unevenly shared, to find ways of reducing or at least constraining the risks and costs of nuclear armories through international accord. By the end of the Cold War a substantial structure of agreements was in place, and in the round this structure undoubtedly contributed to the desired aims. The long processes of building it, and the record of what was and what was not achieved, brought into play a wide range of considerations which remain potentially relevant to future efforts.

Some of the considerations are essentially political, whether internally or internationally—the impact on governmental attitudes, on trust and goodwill, on the willingness of domestic electorates and alliance partners to accept financial or other burdens or to strike bargains yielding dividends elsewhere. Political effects of these kind are customarily hard to measure, but not therefore unreal; their value is often very substantial. But the direct content of arms-control³ agreements relates primarily to military security and secondly to cost; and it is by those criteria that they ought in the first instance to be evaluated.

That evaluation needs to look concretely and coolly at specific implications. Arms control is not an end in itself but one of the instruments available, alongside others such as the provision of armed forces or

intelligence, for achieving security against the hostile use of military power. In the security calculus there is no automatic starting presumption that arms control must be of a standing superior to that of other instruments, morally or otherwise; it is entirely possible for a bad arms-control agreement—a poorly judged bargain, or one not fairly delivered by all the parties—to endanger peace or impair security, or even to increase costs. There is no substitute for examining the merits in context, on a cautious and long-run basis.

The balancing of security considerations alongside political ones, given that they often seem to pull in different directions, can be a complex task with any arms-control proposal. But at least two factors can make the balance-striking particularly testing in the nuclear field. The first factor is that the enormous destructive power of nuclear weapons inevitably makes public debate about their treatment in arms control highly charged; natural abhorrence gives special appeal to ideas which hope by international agreement to avoid or lighten the burden they impose. Expectation of such action may put heavy pressure upon political leaders even where cool appraisal might doubt the real utility of an arms-control initiative. The concern widely voiced in some European countries, especially the Federal Republic of Germany, from the late 1960s into the 1980s that the Soviet Union's medium-range and intermediate-range ballistic missiles ought somehow to be captured in arms control rated poorly in objective security terms. Given the vast size and diversity of the Soviet nuclear armoury overall, it made no real difference how many M/IRBMs there were within it—the Soviet Union had a full range of vastly destructive options anyway against Western Europe—and constraint or reduction in this component was therefore not worth the payment of any substantial security price from within NATO's very different structure of defence provision. But the political 'do-something' demand in non-nuclear Germany and elsewhere plainly became formidable. It is a matter of opinion, now academic, whether different presentation and leadership might or should have held this off; but public confidence in security policies has ultimately, in democracies, a security value in its own right.

The history of Soviet M/IRBMs in arms control illustrates also the second complicating factor. For reasons inherent in the fundamentally novel security calculus which the nuclear revolution imposes, the interactions between the armouries of adversaries are less straightforward than in the pre-nuclear past. With limited exceptions,⁴ nuclear weapons do not exist to fight other nuclear weapons—that notion mostly belongs to pre-nuclear concepts of warfare—and the need for a particular category or a particular number is rarely a function of the adversary's corresponding inventory. The unfamiliar concepts of the nuclear age are however not easy to put across neatly to non-specialist publics, and it is therefore tempting for political communicators to fall back on simpler-seeming concepts like apparent equivalence. This happened in most NATO countries at the end of the 1970s, when leaders often chose to present the case for modernising NATO's intermediate-range armoury with Pershing II ballistic missiles and Tomahawk ground-launched cruise missiles as made necessary by Soviet deployment of the SS20 IRBM. This was not in fact the prime reason why, within the NATO strategic concept for deterrence, modernisation was desirable—that prime reason was the diminishing ability of NATO aircraft to be sure of penetrating Warsaw Pact defences in deep strikes—but its use as the main explanation would undoubtedly have made it hard thereafter, even had the political will existed, to resist public expectation that the two armouries be coupled in arms-control bargaining.

There are other examples of arms-control difficulty arising from the temptations of over-facile public presentation. Though the idea of a comprehensive nuclear test ban has accumulated an international significance which has now to be accepted as an important political fact, its real merits in security terms have usually been overrated. The testing of warheads has been neither a necessary nor a customary route for nuclear proliferation (whether actual or prospective) beyond the NPT-recognised countries, as the diverse examples of Israel, South Africa, India, Pakistan, Iraq and North Korea illustrate; and the testing done in recent decades by at least Western possessors has mostly been directed to improving the

accuracy, reliability or safety of weapons—purposes not obviously undesirable. The political momentum built up behind a CTBT however owed something to the widespread preference among Western governments for using technical difficulties (genuine enough) about verification as a convenient explanation of why progress was not being made, instead of presenting to publics an account—inevitably more complex—of why the advantages were in any event less weighty and less clearcut than enthusiasts claimed.

Another example, as yet of a more academic kind, may further illustrate the point. Some political opinion within the United Kingdom has since the 1970s suggested, alongside a degree of support for the maintenance of UK nuclear capability, that at some stage that capability should be made the subject of arms control negotiation, whether in START or some other framework. The presentational attraction of hints of this sort is understandable; but no coherent indication seems ever to be given of what might be the content of a sensible arms-control bargain—what the United Kingdom might give up (short perhaps of the entire capability) and what security-relevant return might credibly be looked for from others. The absence of any such indication is not surprising. Whatever may be thought about the merit or otherwise of UK capability⁶ or about its particular form and scale, from the early 1960s onwards the considerations which led to its configuration—at what successive governments considered to be the lowest level viable for its purposes—in no way rested upon the precise size or characteristics of the Soviet offensive armoury. At any levels remotely likely to emerge from superpower bargaining that armoury always manifestly possessed, and continues to possess in Russian hands, destructive capability far beyond any possible UK ability either to pre-empt or to ride out.

Arms-control agreement is by no means the only, nor necessarily the best, instrument or reason for constraining and reducing nuclear armouries. (The quest for it may even in some circumstances impair flexibility and inhibit or delay reduction. During the protracted MBFR negotiations NATO offered up a substantial number of Europe-based nuclear warheads which were in fact no longer seen as needed for its deterrent strategy but which were then retained for several years so as not to surrender a bargaining card prematurely.) Even in situations where what is necessary for security is not closely dependent upon what an adversary may do or may be ready to give up, and where the makings of a logical arms-control bargain therefore do not exist, the pressures of public opinion and of cost in any event impose on governments in democratic systems powerful incentives not to sustain larger nuclear armouries than are necessary, as UK and French decisions for reduction in recent years, outside any arms control framework, exemplify.

Nuclear Arms Races and Nuclear-Armoury Costs

Over the past half-century nuclear armouries have absorbed enormous costs. As we look back upon the Cold War most people would probably now agree that the costs need not have been so high—that there was over-insurance in numbers, types or technological standards, even given acceptance of the basic case for maintaining a highly-assured war-prevention stand-off in which over-insurance would be much better than under-insurance. That said, however, an accurate perspective needs to acknowledge points which criticism sometimes misses.

The term 'arms race' occasionally applied to the history of East/West nuclear force provision contained a good deal of rhetorical hyperbole. There was a constant and vigorous competition in the technological sophistication of armouries (except where, as in the field of defence against ballistic missiles, arms-control agreements applied constraint) but though the realities for most of the half-century—on public record, in the West—were in some ways complex they did not, in the round, bear out implications of a desperate contest to outstrip the adversary in the numbers or weight of weapons, or in resource allocation. The facts on the Soviet side were often opaque, but on the Western side average annual expenditure on nuclear armament was much less in the 1970s and 1980s than the 1950s and 1960s; numbers in most

categories of delivery system were more often pruned than increased; and Western totals in both warhead numbers and explosive yield peaked in the 1960s.⁷ Both major powers accepted, from the 1972 SALT I agreement onwards, specific and substantial arms-control constraints on their armouries.

Criticism has often attacked nuclear costs as a deplorable diversion from worthier purposes like the relief of domestic social disadvantage or third-world poverty. Money spent on nuclear armouries, an other aspects of defence provision, is indeed money not spent on such purposes. It certainly ought to be kept as low as legitimate security concerns allow. But the criticism needs to be accurately focused and kept in proportion. Freedom from war is not a luxury, proper to be foregone in a spirit of generous self-denial; it is both a massive good in itself and a condition of most other goods. And huge though the nuclear cost figures seem in the aggregate over the years, they have generally not been a large fraction of available wealth. In Britain during the 1970s and 1980s, for example, the defence budget typically absorbed around forty or fifty pounds sterling out of every thousand in gross domestic product, and nuclear forces on average took no more than one-twentieth (often less) of that budget—around two or three pounds out of the thousand. It would be strange to assign to that two or three, rather than to any other public or private expenditure in the entire remainder, special blame for preventing, say, governmental overseas aid from reaching the level recommended by the United Nations.

There is a wry irony about the costs of nuclear weapons. For what they can provide in contribution to preventing war they are cheap, not expensive. NATO consistently saw them as making it unnecessary to strive for complete parity in other types of military capability, which would have cost much more. It was indeed essentially on this ground that early in its existence NATO rejected proposals—the 'Lisbon' force goals of 1952—directed to achieving conventional parity.

Blind Alleys

The problems of security amid nuclear weapons have naturally stimulated much expenditure of imagination and ingenuity in the search for new ways of evading or easing perceived dilemmas, costs and dangers. The challenge of this search is in itself salutary, and a proportion of the effort has borne fruit in the conclusion of useful arms-control measures and otherwise. A good deal has not. This section reviews some elements of the latter sort.

An important part of the impulsion to escape from the nuclear reality and the wrenching problems it generates has derived, at least in open democratic societies, from fundamental disquiet about the moral legitimacy of possessing nuclear weapons. During the 1980s I was drawn deeply into debate on this. Appendix 2 comments briefly upon the central ethical question.

Alternative Defence

At one extreme in the search for escape lie suggestions that if we think radically enough we ought to be able to find methods of countering—and so, in prospect, of deterring—nuclear-capable aggressors without involving nuclear weapons or perhaps even other types of massive force. Precedents cited include Indian civil disobedience under Mahatma Gandhi, the French Resistance in the Second World War and Yugoslav, North Vietnamese and Afghan achievements against Nazi Germany, the United States and the Soviet Union respectively.

The difficulty is however that even if, debatably, one regards all these examples (which do not include the Jews of Warsaw) as encouraging, none of them reflects the truly hard test case: can such models secure the protection of an advanced state, with all the vulnerabilities of a complex modern urban-industrial society, against a ruthless adversary armed one-sidedly with nuclear weapons? The Resistance was a powerful symbol, but it did not liberate France; and suppose that a nuclear Hitler had been able to

make a Hiroshima of, say, Avignon, and then give notice that Rouen would be next unless the nuisance stopped? It would scarcely have continued.

The underlying reality remains that nuclear weapons provide overwhelming force. Unless we feel able safely to assume that a nuclear adversary will lack the will to use them or that we present no target against which they might be effectively used, arrangements which would confront them with far less force cannot be expected to provide dependable long-term security.

No First Use

The concept of 'No First Use' is that nuclear possessors would give an absolute and permanent promise that never, under any circumstances whatever, would they be the first to use nuclear weapons in a conflict. The idea had a long history in the Soviet Union's declaratory arms-control menu (though Russia has apparently withdrawn it). It was however given special impetus in the West in 1982, when a distinguished group of former US public servants seemed to espouse it. It has received substantial further support thereafter from time to time.

The attractions of this idea are evident, and the desire to establish some sort of barrier against escalation to nuclear exchange is easy to understand. But the idea rests ultimately on sand, as an attempt to preempt and alter by peacetime declaration the harsh realities of what would be immensely stressful and demanding situations with huge interests at stake.

No government for decades past, if ever, has seriously thought of using nuclear weapons save in defence of deeply vital interests where no other course would serve. It is without doubt most desirable, as NATO regularly urged its members during the Cold War, that nuclear powers or alliances should do whatever they reasonably can, by political action and military provision, to reduce the possibility of ever having to face such decisions. It cannot however be wholly abolished. A no-first-use declaration by NATO during the Cold War would have sought to promise that the Soviet Union would be left militarily in possession of any gains—even the complete overrunning of an Alliance member—which aggression, however brutal and cynical, could wrest by the use of conventional and chemical-weapon preponderance. It may now, since the Cold War, be hard for nuclear powers (especially the United States) to see how their deeply vital interests are at all likely to be threatened by non-nuclear action that could not be countered in non-nuclear ways. But if in the end that expectation were confounded, and such interests were indeed about to be intolerably overborne by non-nuclear means—chemical or biological attack, say, or economic strangulation—the idea that a nuclear power would let itself be overwhelmed simply because of a no-first-use promise is plainly absurd; consider again the case of Israel. If a nuclear-possessor country is desperate, whether it be nuclear weapons or something else that has made it so, it will not let its options be narrowed by a past promise made in peacetime tranquillity and without reference to the calamities and iniquities which would have created the dire emergency. It might indeed decide that in all the circumstances (which could take many forms) it preferred defeat to the awful risks of embarking upon nuclear action; but the promise itself could not be conclusive, or even likely to weigh heavily, in that calculation.

A nuclear possessor should certainly have a very strong preference, and may well have a very confident expectation, against ever needing to consider first use; but that is not what an NFU declaration would say—it would claim to express something more. To the extent that it seeks to guarantee that, it cannot be dependable. It is moreover scarcely beneficial to weaken general deterrence of major war by purporting to remove entirely the preventively-helpful shadow of nuclear weapons. More broadly, we should have a deep distrust of taking up, on grounds of advantage in political presentation, positions that rest on false strategic premises. NFU as a universal, unconditional, permanent promise ought not therefore to find favour.

Some NFU proponents have argued that since first use is anyway plainly irrational it cannot credibly contribute to deterrence, and that forswearing the possibility therefore involves no real sacrifice.⁹ The premise in this argument—the asserted irrationality—rests on obsolete concepts, as Chapters 1 and 2 have explained. Suppose however that we concede it: the argument then turns out to prove too much. If first use cannot be rational, what can be the specific nature and purpose that is capable of making second use—that is, response to an adversary's first use—rational? But if second use cannot be rational, then (on the argument stated) it cannot deter; and we end with the strange proposition that the prospect of nuclear use can deter nothing at all, save perhaps in a calculus of pure ultimate-holocaust revenge. If however there is some rational second-use concept short of that—a concept related, as it would have to be, to war-termination—then it is impossible to see why it should be available to second use yet never in any circumstances to first use.

There is hereabouts (though it is not integral to the above refutation) another of the nuclear era's wry paradoxes. No certainties are to be had, and national mindsets may differ substantially, so that mirror-image prediction of an adversary's judgements is unwise; but it is entirely conceivable that in some of the possible range of scenarios first use would actually be less 'escalatory'—that is, less apt to provoke savage response, and more conducive to war-termination—than second use. In the latter case the adversary would already have proved his willingness to engage in nuclear warfare; in the former he might have been hoping to avoid it, and so be more likely to be shocked into re-assessment when the defender demonstrated the hardihood to break the nuclear taboo.

A secondary point mostly particular to the Cold War context in Europe may be historically worth noting. If an aggressor did believe a NATO NFU undertaking—or at least thought it betokened greater NATO reluctance to take timely nuclear action in line with the war-termination concepts outlined on pages 23-24—he might have felt more able to optimise his force dispositions for non-nuclear attack. Such attack can be helped by close massing of forces; but the risk of nuclear strike upon such tempting targets has to be in the mind of an attacking commander, so that his freedom to concentrate is inhibited. If it were not, he might be more likely to prevail quickly at the non-nuclear level; and the NFU promise, if believed, would then have had the perverse effect of lowering the nuclear threshold—the point where a defender must choose between nuclear action and defeat.

It may be objected to all this that there is already in place, and internationally established, a particular category of NFU assurances. In 1978 the United States and the United Kingdom, in terms later substantially matched by other NPT recognised nuclear powers, undertook that they would never use nuclear weapons against any state that was neither a nuclear power nor in alliance with one. Similar undertakings were given more recently in the context of establishing by Treaty nuclear-weapon-free zones in the South Pacific and elsewhere. In pure theory these assurances—'negative security assurances'—are indeed vulnerable to the critical logic outlined above. The limiting clause ('that was neither') and the political make-up of the NWFZs were however seen as reducing to vanishing point the probability that any scenario could arise in which the assurances would close off an option otherwise seriously in contemplation. Even then, the NSAs could not ultimately be bankable under stress. Iraq in 1991 was formally a state protected by them; but a senior military defector¹⁰ later confirmed that the fact of opposing nuclear power was not absent from Iraqi minds during the Gulf War in their appraisal of the option of using their chemical armoury, and the United States will surely have intended that to be so when it uttered gravely menacing albeit carefully unspecific warnings against such use. (It is partly for this reason of realism that the idea¹¹ of formally re-shaping the NSAs to provide more explicit deterrence of chemical- or biological-weapon attack offers too little added value to warrant re-opening their terms to a contentious debate likely to entail undesirable trade-offs).

A promise of no first nuclear use, if believed at all, could only lighten a potential aggressor's perception of risk and so stand to weaken deterrence. Yet it would have done nothing dependable to diminish real risk

(as NATO and others always recognised in relation to the no-first-use promise on chemical weapons conveyed by the terms of widespread accessions, including by the Soviet Union, to the 1925 Geneva Convention). There is no physical way of rendering nuclear weapons incapable of first use. The underlying reality remains that it is not possible to arrange for major war to be conducted between advanced powers without some possibility of nuclear use; and policies which attempt to erase that possibility by declaration are doomed to fail. If they have any security effect, it may lie simply in the direction of lessening the fear of war, which in the absence of global political transformation is the surest available preventive.

Minimal Armouries

There is no doubt that for many reasons, including cost, nuclear armouries ought to be kept as small as their proper security purposes allow; that at least those of the two biggest powers have in the past mostly been larger than was necessary; and that the present level of their holdings, reduced though it already is, could safely be lowered considerably further.

Some suggestions are to be heard that the levels could with advantage eventually reach as low as a hundred weapons for each major possessor. It is however fallacious to suppose that there is a straight-line graph in which the advantages (political, financial, safety or other) of reducing armouries rise steadily as numbers approach zero. A hundred weapons are not far more acceptable politically, more virtuous morally, safer, more stable in security terms or even necessarily many times less expensive than, say, a thousand. The 'advantage' line in some of these respects may actually turn downward as numbers fall. If there is a serious case at all for the retention of a nuclear armoury, it is imprudent to take risks about its adequacy by extreme pruning for pruning's sake—there is no sufficient benefit to be had from taking risks at the margin.

The drawbacks of a hundred-or-similar level for a major power will vary in span and degree with the particular characteristics of the armoury in such terms as types, deployment, delivery systems, penetrative and other performance, reliability, protection and logistic support. But a basic list might include these:

- a. A hundred-weapon armoury must be an easier and more tempting target for pre-emption (whether by nuclear weapons or in some other way, not necessarily of orthodox military character), and so less conducive to stability, than one in the order of a thousand;
- b. It must be more sensitive to erosion by accident, like fire at a depot;
- c. It must be more vulnerable to technical mishap, such as an unexpected design fault emerging in weapons or delivery vehicles. The United Kingdom, with an armoury of modest size, has vivid memories of two events: in the 1960s an entire bomber type—the Valiant—had to be retired virtually overnight when a grave airframe-fatigue problem was found; more recently, continuous SSBN patrol could have been lost when a fault came to light in the propulsion system of some of the Resolution-class submarines;
- d. Because the level is drawn with such tautness, verification of the control regime becomes both more important and perhaps more difficult. At a thousand, it does not much matter in bottom-line security terms if someone cheats by, say, fifty weapons; at a hundred it can matter considerably;
- e. Partly as a result of that, both the potential advantage and the potential ease of effective break-out are higher, and the potential temptation mounts accordingly. A quick clandestine spurt by a violator (possibly partnered by some well-timed pre-emption by one method or another) has a far better chance against a hundred than against a thousand of seizing a crucial advantage—a key change in power balance—before others can react effectively;

f. At such a level it becomes at best much more difficult to devise credible and acceptable use doctrine and targeting policy.

Point f may merit expansion. Chapter 2 has explained that if weapons are to deter they must be capable of realistic use—they cannot serve even a solid political function if they are nothing but symbols or negotiating counters—and that there are also good reasons for having options evidently available for different types and levels of nuclear strike. Those reasons, though first elaborated in the Cold War context, are not exclusively related to that context; the underlying concepts are of permanent relevance. It is hard to be confident that a hundred-warhead armoury could provide an adequate range of options for a state with worldwide involvement and responsibilities such as those of the United States. Having a given number of warheads held somewhere in inventory is of course far from equivalent to having an assured capability to mount that number of successful strikes at required times and places.

As to targeting, it is another paradox, uncomfortable but true, that below a certain level the fewer weapons there are available the cruder targeting may need to be; the planner may be driven to envisage population-killing counter-city strikes in order to construct an ultimate penalty grave enough to undergird deterrence of an adversary who is, virtually *ex hypothesi*, determined and perhaps brutal. But to reverse the trend there has been in the West, from the later years of the Cold War onwards, away from counter-population targeting would be of low credibility; of low political acceptability, both internationally and domestically; and ethically intolerable.¹²

A level of a hundred for a major power has many of the disadvantages of tokenism. Potential adversaries may be minded to judge that having come down so far the possessor does not really mean business at all, that he lacks ultimate resolve; and from another direction it would probably become much harder, not easier, to hold off politically those who believe that the proper level is zero.

The Strategic Defense Initiative

In a dramatic speech in March 1983 President Ronald Reagan placed before his country the goal of a comprehensive defence shield against ballistic missiles—an impermeable Astrodome surely protecting the entire homeland. A massive weight of sceptical criticism has accumulated around this concept, and in its pure form it scarcely seems to retain any substantial body of convinced advocates. Vigorous and complex debate continues about the merits or otherwise of systems for intercepting ballistic missiles, but with more modest goals. This account does not attempt substantive appraisal of that debate. The original utopian aspiration does however offer another illustration of the desire, similar to the longing to abolish nuclear weapons themselves, to find physically-guaranteed escape from the nuclear revolution—to recover somehow a lost invulnerability. Reality cannot however be evaded or reversed in such ways. The pervasive and permanent truth with which humanity now lives is that science has put in our hands virtually infinite destructive power, from the shadow of which there is unlikely to be technologically-assured exemption. The realistic hope has to lie in political understanding and skills, based on awareness on all sides that we have reached the *reductio ad absurdum* of war, with that awareness progressively supplemented and if possible one day made redundant by political structures which can provide, worldwide, dependable non-military routes for constraining and resolving all conflict between states.

Notes

1. Colin S Gray.
2. 1996 media reports quoted Robert McNamara in these terms.
3. For convenience the term 'arms control' is used here to include also actual disarmament, though many useful arms-control measures do not entail that.

4. The main perceived example during the Cold War related to the US and Soviet land-based ICBM forces. In assessments of stability, force requirements and arms-control balance much concern was customarily focused upon whether one of these forces could pre-emptively eliminate the other. It is possible to suspect that the concern sometimes became disproportionate to the practical reality of the scenario; but however that may be, direct operational relationships of such a kind are the exception in the nuclear field.
5. Denis Healey in *The Time of My Life* (Penguin Books, 1989, p.500) reports an idea that the Soviet Union might have been ready to give up capability quantitatively equal to that of the United Kingdom, but he does not explain what significant security benefit to the United Kingdom might have resulted from reduction by a few percent in the over-ample Soviet armoury.
6. The basic rationale for UK capability is reviewed in Appendix 1. 7. Canberra Commission Background Papers, pp.9-10.
8. The group comprised McGeorge Bundy, George Kennan, Robert McNamara and Gerard Smith. I say 'seemed' only because in a 1983 exchange with me McGeorge Bundy disclaimed that the undertaking would be intended as utterly absolute.
9. See for example Canberra Commission Report, pp. 34 and 57. 10. Lieutenant General Kamal Hassan.
11. See David Gompert et al in *Survival* Vol 37 No 3, Autumn 1995, pp. 27-44, and my letter of comment in Vol 37 No 4, Winter 1995-6, pp. 189-191. 12. See Appendix 2.

Chapter 4

After the Cold War

The existing nuclear armouries—especially the vast ones held by the United States and inherited by Russia—were built up essentially in the setting of the Cold War, and the main elements of nuclear doctrine were developed in that stark and relatively simple context. It is therefore natural and indeed salutary that debate should now ask how much if any of these inventories and doctrines need be accepted as still appropriate in the new environment—cloudier and more complex, but less confrontational—that follows the collapse of Soviet Communism and its empire. Campaigns to designate outright abolition of nuclear-weapons as a policy objective for immediate worldwide acceptance, albeit long-term implementation, have attracted noteworthy support.¹

A great deal of the material content of nuclear armouries can clearly be reduced—much indeed has already gone or is firmly due to go. Some of the detailed application of doctrine also ceases to be relevant. The basic nuclear revolution is however irreversible, because the knowledge is unforgettable; and the world's political systems have to live with and somehow manage that reality for the rest of human history.

The fact that we cannot hope to predict the course of history does not dispense us from managing matters in our own time by the best judgements we can make. Those judgements must however recognise that uncertainty, and the difficulty of seeing far, are part of the practical reality to be managed; and so is the fact that in defence provision major change can take a long time. Even if all concerned agreed immediately to the abolition of nuclear weapons, it could not be dependably achieved in less than decades. Conversely, if an open democracy that had genuinely accepted and implemented abolition felt compelled by the actions of others to recreate an armoury, that too could take many years, especially if the safety, security and operational sophistication of system now laboriously achieved were again required. Meanwhile political change, often of a dramatic kind, can happen much faster, as the end of the Cold War itself illustrated. This inherent mismatch in timescales is commonplace right across the defence field; almost every armed conflict into which Western countries have been drawn in the past half-century has had to be fought by forces designed long before the particular political context was foreseen. For open democracies, defence provision is essentially insurance against the unexpectedly disagreeable, and it has therefore to take a long, cautious and in a sense pessimistic view of what demands political upheaval might generate.

The magnitude of the nuclear reality and its impact upon warfare call for that caution in special degree, and for a clear eye upon what has to be, as between advanced states, the real objective: the outright prevention of war, not the physical constraint or removal of particular weapons. It must be likely that the nuclear-caused *reductio ad absurdum* of warfare made at least some contribution to the historically-remarkable absence of war between major powers during an awkward and abrasive half-century. The Cold-War opponents became deeply aware that whatever disagreements might arise between them, they must so conduct the management of these that they would never come significantly to blows at any military level. Whether or not we can now foresee plausible detailed scenarios of conflict, it would be a bold step to act now, or to set policy goals, on an assumption that we can achieve equal success in the next half-century without the contribution of nuclear weapons—that is, by claiming to abolish them—in a world politically regulated (or not regulated) broadly as it is now.

The above formulation uses two important qualifications: 'claiming to abolish' and 'within a world politically regulated... as it is now'. The point of the first is that, given the ineradicable knowledge, irreversible abolition is not possible; and a key test question flows from that. What is to happen if in a new world where we have purported, by removing the nuclear wild card, to re-rationalise warfare,

advanced states do come to blows over issues which they regard as too crucial for defeat to be tolerable? We have no adequate ground yet for supposing that history will never again make that uncomfortable question real. If such war does break out, there must be a high risk that one or other side, or both, will feel unable to count on the other's willingness to trust the nuclear-abolition regime, to observe faithfully its constraints and prohibitions, and to continue accepting the untrammelled activity of its external monitors and inspectors. The world might then face one of the most dangerous scenarios conceivable—that of advanced states engaged in a competitive rush to nuclear re-armament amid the heat and pressure of imminent or actual major war.

The second qualification relates to the global political environment. The abolitionist case typically postulates—as indeed it needs to, if the outcome is to claim stability and trust even in the calm of peace—an international verification regime of great thoroughness and openness, with highly intrusive and compulsory monitoring, with coverage from which no significant state is allowed exemption, and with sanctions of a certainty and severity such as dependably to compel—not merely encourage—the timely reversal of any attempted violation. Even if we temporarily set aside the problem of what is to happen to this edifice amid the firestorm of war, we have to recognise that it implies a global political scene far removed in character from anything that exists today or seems to have any early prospect of existing. In particular, it would require a United Nations or equivalent international authority with the legitimacy, resources, competence (both legal and practical), strength and determination needed to impose its requirements worldwide, even upon the unwilling and powerful.

An authority with such characteristics would be a great instrument; it would probably indeed, by its nature, be capable of solving the problems at an earlier and more fundamental point, by so regulating disputes between states that they did not come to war at all. But to describe all this, and see it as desirable, is a different matter from using it as the basis for a policy of nuclear abolition—unless perhaps we believe,² implausibly, that abolition will be accepted universally as a goal so desirable and so important as to override all other considerations of national attitude, system, loyalty or interest and itself become the engine to change the world in this sweeping way.

These ideas have been expressed above in brief general terms, without specificity about particular states or scenarios. We do indeed need to be ready to think about the issues in a very long and broad perspective, reaching beyond what we can see as having verisimilitude today. The obstacles and drawbacks to abolition can however be illustrated more concretely. There are manifest problems about its acceptance; about its verification; and about its effects.

Under the 1968 Nuclear Non-Proliferation Treaty there are five recognised and legitimated nuclear-weapon possessors—the United States, Russia, China, Britain and France. The likelihood is vanishingly low that all, or even most, of these five states would genuinely accept and work towards complete nuclear abolition in global political conditions anything like those now prevailing. And the same is true, in one way or another, of three other states—Israel, universally supposed to possess a nuclear capability even though its formal avowal is deemed impolitic; and India and Pakistan, both similarly believed to have taken nuclear development to a point where an operational capability could swiftly be brought in being.

Even if internal difficulties about ratifying the existing strategic nuclear arms control bargain (START II) are overcome, and if hopes for a START III prove well-founded, Russia is a state reeling from profound internal and external upheaval, and conscious of wide instability and mistrust around her borders. She shares with China—whatever the short-term ebb and flow of their political relationship—an immense frontier along which confident defensive adequacy is unachievable with her conventional forces. Her conventional capability overall is anyway in deep disarray in materiel, training and morale, as the debacle in Chechnya demonstrated. For reasons like these Russia has been reshaping defence doctrine in ways

that tend to put more emphasis, not less, on nuclear weapons—she seems for example to have withdrawn her longstanding declared preference for a No-First-Use agreement. Beyond this, the nuclear armoury constitutes the one unmistakable claim Russia now has to special status internationally. It is unreal to suppose that any likely Russian leader—even if still a democratic one—will be seriously interested, beyond perhaps the level of public rhetoric, in abandoning the sense of underlying security assurance, and of political importance vis-à-vis the United States and the rest of the world, which nuclear-weapon status confers.

From President de Gaulle's day onwards the idea of France as a nuclear power has been at the heart of her national self-awareness and self-confidence. France has made a huge investment of political credit, scientific effort and financial resources (she has probably spent more than Britain by a factor of at least three or four, with heavy opportunity costs elsewhere) in building, more or less independently, a capability of which she is deeply proud and to whose maintenance she is deeply attached; the controversial episode of the final nuclear test series in the South Pacific illustrated that. France is moreover a great and distinctive nation looking back on more than a century of history which in military terms has seen a large share of defeat and disaster (much of it due, in ingrained national mythology, to being let down by others). Nuclear weapons in French hands are the grand equaliser, the guarantee that France cannot be humiliated again. To construct scenarios, in any world at all like the one we live in now, in which France gives all this up is again beyond reasonable probability.

Russia and France seem the two cases, among the recognised five, where renunciation seems most clearly far-fetched whatever other countries may do. The obstacles in respect of the other three are more obviously (though perhaps not only) of an interactive character. The United States has world-wide concerns and responsibilities on a scale no other country now approaches—she is, in effect if not in formal recognition, the prime steward of the international system. Whatever long-term view may be taken of US superiority in high-technology conventional capability, which is neither limitless nor eternal, it must be out of the question that the United States should surrender nuclear capability so long as it remains in any other hands whatever, whether declared or undeclared. (It is also worth considering, if US technological superiority were indeed to be seen as pervasively overwhelming at non-nuclear levels, what that might imply for likely Chinese—and Russian—readiness to surrender all nuclear capability.) So long as the United States retains capability, China will surely demand the right to do so. The United Kingdom is, of the five, perhaps the least locked-in strategically by such interactions, though French retention might touch historical emotions. But with its major modernising investment just coming to completion, it cannot be likely that a UK government of either main political party would make and sustain an unconditional promise not to renew that investment decades hence irrespective of what the global scene might then be.

The repercussions reach on into the 'unacknowledged' three. India will not commit itself to abolition unless China does (and probably also the remainder of the five). Pakistan will not commit itself if India does not. Israel is a special case, illuminating because the relevant interactions are not obviously nuclear ones: it cannot be expected that Israel will truly surrender its unavowed capability unless its peaceful existence within settled and secure borders on terms it finds satisfactory is solidly accepted by all its neighbours in the region.

The second category of problems about abolition is distinct from but related to that of basic political acceptance: it concerns verification. The world community, and especially the present nuclear possessors of whom proven renunciation would be required, could not accept an abolition regime unless it was underpinned by verification arrangements of great strength and dependability. The standard of assurance needed would be higher than has been the norm in most previous arms-control agreements, for two reasons. First and most obviously, because of the unique impact of a nuclear breach in a non-nuclear world—the specially powerful leverage which a violator would be trying to seize. But secondly, and less

often noted, an abolition agreement would, by definition, lack the underlying corrective and deterrent power which the continued existence of nuclear armouries has in the past provided in tacit support of other arms-control agreements. (For example, a state cheating—as the Soviet Union undoubtedly did—on the poorly-verified Biological Weapons Convention of 1975 would have known that Western nuclear power would loom over any attempt to exploit the illegal behaviour.) So long as nuclear armouries were still there to overtrump the prohibited sorts of capability if a signatory state did breach its agreements, the open democracies could afford to settle—and from time to time did settle—for a good deal less than watertight perfection in agreements to ban other weapons. But that back-up would now no longer be available.

As noted earlier, supporters of abolition typically accept that their preferred course would require a verification system of exceptional scope, depth and solidity, embodying an unparalleled combination of demanding features. The historical examples of Iraq and North Korea (both signatories to the NPT) illustrate the difficulties about aspects of this—the former in particular, even in defeat and disgrace, has proved a remarkably tough nut for WMD verification to crack. In a different way, South Africa offers further illustration; and all these three seem relatively easy cases by comparison with what would be entailed if misgivings arose about the actions of (say) China, or of a Russia whose political evolution had taken a course different from that for which open liberal democracies now hope. To postulate a verification system of the rigour and permanent effectiveness required is not to postulate a set of ancillary technical requirements in support of a political agreement; it is to postulate a radically more benign configuration of the world.

The drawbacks extend further yet, beyond those of political acceptance and secure verifiability. It is already evident that as we move into the next century the major tasks which the global community must expect to have to manage include accommodating the likely rise of China towards something like superpower status, and the settling of Russia into a configuration, both internal and external, with which she and her neighbours can live in a better degree of stability and contentment. These tasks—even if the march of history sets alongside them no others of comparable magnitude to add complication or distract attention—will be a formidable challenge to political skills. The nuclear *reductio ad absurdum* of warfare between major states is the best way yet established of ensuring that amid stress and uncertainty they remember always that there are no military options for settling disagreements—that political management is the only path available. It is not necessary to impute deep ill-will to China, or apply gross over-pessimism to Russia, to recognise that purporting to re-rationalise military conflict would not improve the political and psychological framework within which awkward issues will have to be resolved. And since the re-rationalisation of military conflict could not in fact be made dependable, the underlying implication of nuclear abolition would be that we were confident of having permanently and irreversibly removed military force or even its shadow from the conduct of relations between advanced states. That would be a remarkably bold claim on which to base security arrangements.

It is of course possible to postulate circumstances in which through goodwill, good fortune or political skill all the elements of the long recital of difficulty offered above have fallen away, and in which ingrained habit, wisdom and keen awareness of the latent nuclear possibility even in the absence of its physical realisation serve to rule out war between advanced states. But all this would imply a world very different from the one we live in today, let alone from any worse one that we may encounter, amid all the uncertainties which follow the breakdown of Cold-War structures, should events turn out less well than we now hope. In short, the abolition of actual nuclear weapons might be credible, natural and welcome as a consequence of sweeping and dependably irreversible changes for the better in the political character of the world—indeed a New World Order. But to make such sweeping changes merely instrumental assumptions in support of disarmament preferences is to get policy the wrong way round. Unless and until policy has tackled those political changes, and given them in their own right far more

probable reality than they seem near to having now, nuclear abolition belongs at best in the category of aspiration, not policy. (As page 42 has noted, the much-appealed-to Article VI of the NPT conspicuously couples nuclear disarmament with general and complete disarmament, which can scarcely be characterised now as policy.) And to present aspiration as policy is sometimes not merely unrealistic; it can be positively damaging, both as diverting effort from less spectacular but more realistic improvements and as creating, in democracies, public expectations and pressures which demand or assume the agreeable outcome before the tough conditions have been fully met.

In his memoirs³ Salvador de Madariaga, a distinguished figure in League of Nations disarmament effort between the world wars, wrote as follows:

'The trouble with disarmament was (it still is) that the problem of war is tackled upside down and at the wrong end. Upside down first; for nations do not arm willingly. Indeed, they are sometimes only too willing to disarm, as the British did to their sorrow in the Baldwin days. Nations don't distrust each other because they are armed; they are armed because they distrust each other. And therefore to want disarmament before a minimum of common agreement on fundamentals is as absurd as to want people to go undressed in winter. Let the weather be warm, and people will discard their clothes readily and without committees to tell them how they are to undress.

Then, disarmament was tackled at the wrong end. A war is the ultima ratio in a conflict; a conflict is the outcome of a dispute that has got out of hand; a dispute is the consequence of a problem that has proved insoluble; a problem is born of a question that has not been tackled in time. Disarmers would avoid wars by reducing armaments. They run to the wrong end of the line. The only way is far more humdrum and modest. It consists in dealing day by day with the business of the world. It follows that disarmament is an irrelevant issue; the true issue being the organisation of the government of the world on a cooperative basis.'

It in no way follows from the argument offered in this Chapter that policy for the future of nuclear weapons in world affairs has to be built around cynicism, immobility or despair. A diverse programme of nuclear change has already been tackled, and it can without doubt be pursued a good deal further in order to yield a nuclear world of lower salience, lower cost, less adversarial character, smaller numbers and even less real risk than now. For brief example, there may be much more yet to be done, to the advantage of security, in such fields as the following:

a. reducing the number of nuclear warheads and delivery systems, and perhaps bringing the former under direct control and verification, as many of the latter already are.

There is no doubt that US and Russian reduction of armouries classified as strategic can go considerably further than in START II (and early steps to work out a START III bargain such as US and Russian leaders have commended in principle might valuably help the ratification of START II, which in some respects has for Russia awkward halfway-house characteristics). New agreements expressed and verified in terms of warheads could lighten any fears of reversibility or break-out, and so reinforce long-term confidence. And it would be highly desirable, in the interest of international control, to bring into discussion the non-strategic components—still very large, and indeed now apparently much larger than US counterparts—of the Russian armoury.

The much smaller holdings of the remaining three 'official' nuclear powers reflect assessments of need not varying with the size of the larger armouries (see page 46). But it is for consideration that, as a contribution to global confidence, the reductions already made unilaterally by France and the United Kingdom might be internationally entrenched and the

resulting levels verified as US and Russian ones are: and that Chinese holdings, as yet unreduced, should be brought into account similarly.

b. relaxing, wherever they still remain, tense and costly high-alert operational states.

c. reducing the spread of weapon deployments.

There are drawbacks to over-concentration—for example, in the vulnerability of single-point holdings to attack or mishap—and it would moreover be undesirable to change (in particular) US dispositions in a way that seemed to betoken either a weakening of US commitment to allies or a hand-washing reluctance by allies to continue sharing political and moral responsibilities. But in principle some further concentration of remaining inventories would be helpful to cost-saving, control and verification.

d. exchanging information more freely and openly about nuclear armouries, and in particular about best practice in the safety of storage, handling, management and perhaps design.

It would be desirable to extend dialogue beyond the former Cold-War adversaries, in particular to China.

e. entrenching still more durably, for political reassurance to non-nuclear nations, the norm against any nuclear testing.

f. constraining further the production of nuclear-weapon materials.

The practical impact of this needs to be kept in perspective, given the amount already in existence of the special materials capable of use in nuclear weapons and the fact that a high and increasing proportion is now of civil rather than military origin. But international constraint on them could contribute usefully to the cumulative weight and political impact of nuclear-weapon control regimes.

g. bringing under more assured account and control the nuclear materiel (and perhaps the nuclear expertise) of the former Soviet Union.

Much has been achieved, especially in relation to forces once deployed in non-Russian states of the former Soviet Union. But it cannot be claimed that conditions are yet generally satisfactory. Though conjectures about terrorists with suitcase bombs are often exaggerated, there remain types of possible leakage—for example of material dangerous enough even without nuclear-yield explosion, or of components or knowledge that would be useful to a proliferator state—which it is important to seal off as firmly as possible. Western aid, by the United States and others, has played a useful part in this field, and the need for it is unlikely to be at an end.

h. developing further—where possible on an international basis—the tools and systems of information collection and analysis, and of materiel handling and system destruction and disposal, needed to support agenda elements such as a, f and g above.

These elements may increasingly need techniques reaching beyond the familiar tools for verifying and implementing existing arms-control agreements; and experience in dealing with Iraq's tenacious concealments underlines that the tasks may be highly demanding.

i. strengthening the various instruments (see page 40) which work together to prevent or impede further proliferation.

j. easing any political friction by underscoring that remaining armouries are not directed against particular adversaries.

Declarations about targeting are in themselves strictly unbankable political atmospherics, since they are both unverifiable and readily reversible. But wider development and

explanation by nuclear possessors of doctrines which do not turn on adverse assumptions about particular countries named or implied, and do not seek to justify force provision on such grounds, is appropriate to the low-key-insurance basis for the continued existence of nuclear armouries in the post-Cold War world. There would be merit also, not least on ethical grounds, in moving avowed doctrines and planning further away from massive counter-city strike.

k. consolidating and perhaps further extending nuclear-weapon-free zones.

l. exploring more fully the contribution which military defence systems might be able to make to diminishing still further any residual nuclear risk.

There remains much room for debate about whether or how far direct defence, as distinct from political action and military deterrence, is of sufficient value in relation to the real probability of threats, and to opportunity-cost penalties within constrained budgets, to warrant heavy effort. Options for defence against nuclear attack by ballistic missiles, in particular, would need to weigh possible damage to the widely-welcomed ABM Treaty regime. But debate on these issues should at the least be kept live, and understanding of technical options sustained.

It is beyond the scope of this account to evaluate in detail, or to rank in order of feasibility or priority, precisely what can and should be done in these various matters. But on any view they constitute, in the aggregate, a large and useful agenda that will command much time, effort and other investment. The agenda may well be capable moreover of yet further enhancement nationally or internationally, for example in respect of the conditions in which remaining warheads and delivery systems are held, and perhaps of wider and more systematic UN involvement and oversight, as by the Security Council, in order to deepen the sense that remaining nuclear capability should exist primarily as ballast and insurance in the overall international system rather than as special homeland protection for a privileged few.

The merits—in some instances the imperatives—of these agenda items stand irrespective of any abolitionist commitment. None is dependent on that, and their prosecution will not be advanced—perhaps even the contrary, since political, diplomatic and technical efforts (all of them finite resources) may be distracted, or a pretext for inaction or delay provided—by now designating such a commitment as the essential and practical central goal, when in political reality it is neither feasible nor necessarily desirable.

Notes

1. See for example the Canberra Commission Report, and the statement by General Lee Butler and General Andrew Goodpaster, with many other military signatories, published on 4 December 1996.
2. As is, for example, explicitly assumed by Michael McCwire in Canberra Commission Background Papers, pp.57 and 67.
3. 'Morning Without Noon', Saxon House, 1974, pp. 48-49.

Chapter 5

Conclusion

There are many types and levels of armed conflict—some of them hugely destructive of human life, some of them moreover engaging nuclear powers—to which nuclear weapons are plainly irrelevant. Such types and levels have occurred continually in the past half-century, whereas those to which nuclear weapons seem relevant have not happened at all. It may be tempting, but it is certainly shallow, to deduce that the later sort can have no possible reality and nuclear weapons therefore no utility. The causation for the long absence of war involving key interests of major advanced states is unprovable, but the absence is historically remarkable and immensely beneficial.

A world in which that absence could be reliably perpetuated without any state needing to possess nuclear weapons may one day become attainable, and it would be a better one than we have now. It may be wholly appropriate to keep the hope of that alive as an aspiration in the thinking of peoples and leaders (just as during the Cold War hopes of the demise of Soviet Communism and the reunification of Germany were properly kept alive in Western minds—and, equally properly, not actively expressed as Western policy objectives). But the means for creating a world without actual nuclear weapons would have to be of a basic political kind, not a matter of technical arms control. Secure nuclear abolition would be consequence, not cause; and in the journey it has to be cart, not horse.

Meanwhile, we need to keep our gaze firmly fixed on the prime goal. The reduction of war between advanced states to madness, through the nuclear revolution, is an awesome fact. It is however scarcely a fact wholly to be deplored if the effect is—as it was in the long and awkward years of the Cold War—to erase the initiation of war from the list of options which practical decision-makers heading major states can consider or must reckon with in the conduct of international business.

Better unquestionably, pending political transformation, to have nuclear weapons but not war than to have war but not nuclear weapons (even if the latter option were, as it is not, dependably feasible). The continued retention of nuclear armouries on a limited and transparent scale in the hands of a few internationally-ratified possessors helps to seal off any possibilities of armed conflict among advanced states; it reduces the incentive to any clandestine acquirers, since it diminishes whatever leverage they might have hoped to seize; and it offers an overshadowing in-reserve discouragement to intolerable state behaviour of other extreme kinds. It is entirely possible to pursue the extensive and valuable agenda that is available for further reducing the scale, salience, cost and risk of nuclear weapons while still benefitting from the underlying contribution which they uniquely make to security in any world at all like today's. That is to align policy with the grain of reality.

Appendix 1

Britain as Nuclear Power

The key concepts which have offered justification in security terms for Britain's maintaining a nuclear capability are two linked ideas (although political and other motivations, as distinct from security rationales, were always more diverse across the wide span of time and of people involved). One idea is that of a 'second centre' of nuclear decision-making within the Western political grouping; the other is that of independence.

From early in the nuclear age the US armoury was more than adequate in material terms—numbers, diversity, reach and technical and operational quality—for the needs of any alliance or coalition to which the United States was committed. The security case for any of its partners to spend scarce resources on providing an independent supplement could rest only on hypotheses that in some scenario or other the US armoury might be thought not available, or not reliably available; for example, that in the situation of effective nuclear parity between East and West, with the United States itself inescapably under mortal threat, the Soviet Union might calculate (or, as British spokesmen were usually careful to say, miscalculate¹) that when real operational decisions had to be faced US nuclear power would not be used, or not fully and promptly used, in the defence of Western Europe. The existence of independent nuclear capability in Western Europe, far more directly threatened by possible Soviet aggression, was seen as a useful added insurance against any such assessment.

Given such a premise, what independence had to mean in practice (at least from the standpoint of security need; cloudier considerations of political posture or national image are not addressed here) depended on what were the scenarios of perceived US non-availability to be insured against. Such scenarios could be of two kinds. The first would postulate that the United States, while still politically committed to its allies, might hold back when faced with the nuclear decision amid the heat and fear of war. The second would postulate a deeper and longer-term estrangement from Europe—a radically-changed environment in which the United States had disengaged from European security, and in particular had withdrawn its cooperation and abrogated any obligations to European allies in nuclear procurement and support. If it were desired to cater just for the first sort of scenario, what was needed was simply operational independence (call it Mark I): the capability to press nuclear launch buttons whether or not the United States so chose. But to insure also against the second sort—long-term US estrangement—required procurement independence (Mark II). It is unilluminating to argue about which Mark is 'real' independence; the practical point is that they are alternative insurance policies. As is customary in insurance situations, the wider the cover required, the higher the premium. The United Kingdom chose, from the beginning of the 1960s, to take out the Mark I level of cover; and this mostly cost no more than five per cent, and indeed often considerably less, of the annual defence budget. French experience appears to suggest three or four times as much for Mark II. The difference in insurance cover is also a major difference in long-term opportunity cost elsewhere in defence provision, as comparative contribution to Alliance non-nuclear capability and in the Gulf War may show.

A wide variety of considerations, including both domestic and international political ones, bore upon whether the United Kingdom should choose to maintain a capability to meet this rationale of second-centre operational (Mark I) independence; and the design of the capability raised further issues, for example about its make-up, weight, assurance and targeting.² The central security question which successive governments needed to ask themselves was however whether such a capability yielded the best 'added value' as compared with other possible uses of the resources it absorbed, such as the provision of stronger conventional forces or indeed national purposes outside the defence field.

It is likely that not everyone who supported the case for a UK nuclear capability would have accepted this formulation of the central issue as a judgement weighing second-centre added value against cost. Some appeared, at least in their choice of justifying language, to attach to the capability an absolute importance—to believe that it lay so crucially at the heart of national security that it ought to be sustained *coute que coute*, rather as French official doctrine has seemed to hold in relation to French nuclear capability. My own view was and remains less unqualified. For hypothetical example, if domestic political or economic exigencies had so strained the UK defence budget during the Cold War that a choice had to be made between foregoing the modernisation of UK nuclear capability and making inroads on a scale unacceptable to allies into NATO-committed land/air contribution on the European continent, I should probably have advised in favour of the former. (That would certainly have been so had the UK had to contemplate modernisation on Mark II rather than Mark I terms.)

That hypothetical example leads into a more actual consideration about the merits of British nuclear capability. The pattern—both geographical and political—of full British commitment to NATO gave the capability's added value (be it judged large or small) a, particular Alliance dimension. The United Kingdom expressed no formal nuclear assurance to the Federal Republic of Germany (nor was any sought, though German belief that British capability was helpful to NATO deterrence was made plain) beyond that already implicit in the terms of the Brussels Treaty and the North Atlantic Treaty. There were however clear implications carried by a UK stance of full membership in the Alliance's integrated military structure and its nuclear planning effort, partnered by the forward deployment in Germany of the only field army the United Kingdom possessed together with substantial air elements including UK-owned nuclear forces.

The US nuclear armoury was itself a massive insurance policy; and a supplementary capability based on a second-centre rationale, as an insurance policy against the failure of the first insurance policy, was inevitably directed therefore against a scenario of low probability, albeit relating to an eventuality that would be uniquely disastrous. That low overall probability was part of what the balancing judgement—value against cost—properly had to weigh. Critics sometimes however misunderstood the structure of the judgement. In particular, it was occasionally argued that the United Kingdom must be at least as likely as the United States—perhaps much more so—to balk at the nuclear decision, and that the notion of adding deterrent value by the second-centre concept was therefore empty. But the concept does not in fact depend on any comparison between the two 'national' probabilities. The point and effect of operational independence is that the British probability, whether larger or smaller, is a separate and additional probability, a further and different complicating uncertainty which an adversary would have to weigh, not a lesser included case.

In today's new international setting, with the Cold War now a matter of history, the second-centre-insurance case is clearly less cogent than it used, to be. Whether it would warrant the renewal of British independent capability if that decision were being taken now on a clean-sheet basis is however academic; the investment cost of updating the SLBM force (all other nuclear-force components having been phased out) is essentially spent or committed. It is indeed a vivid reminder of the inherent mismatch between lead-time in defence provision and possible political change that the initial decision to acquire the Trident missile system was taken in 1980 and the first submarine carrying it became operational in 1995. Such a decision would certainly now be a great deal more open to doubt and debate, on both policy and opportunity-cost grounds, than Labour and Conservative Prime Ministers judged it to be at the time.

Capital expenditure is however substantially now past, and annual maintenance cost is of a markedly lower order.³ Major modernisation will scarcely need to be addressed again for many years yet—Trident's predecessor, Polaris, was in UK service for twenty-eight years, and the operational environment seems much less likely to pose mounting technical challenges in future than during the Cold War.

Meanwhile, if there are cost savings (though they are unlikely to be of massive scale) to be had from operating the force at levels of readiness less demanding than in the past, they will be worth pursuing. More dramatic measures—discarding the capability entirely, or attenuating it much further than has already been promised—will be justified only if the defence budget comes under acute pressure, or conceivably if realistic prospect were to emerge that such changes by the United Kingdom would yield solid and durable advantage to security through the difference it made to the practical choices made by other states in their own perceived interests. It is however not easy to see scenarios and courses of action truly likely to meet this latter test.

Notes

1. Occasional statements such as those by Robert McNamara and Henry Kissinger, some years after leaving office, might nevertheless have pointed rather to 'calculate'.
2. The UK approach to these issues was illustrated in special papers (DOGD 80/23 of July 1980 and DOGD 82/1 of March 1982) published to explain Government decisions on the acquisition of the Trident SLBM system.
3. The average annual operating cost for the Trident force has been provisionally estimated at £200 million (House of Commons Defence Committee Report, 5 July 1995, paragraph 5).

Appendix 2

The Ethics Of Nuclear Weapons

Like any other human activity, policies about nuclear weapons must be accountable at the bar of morality. It is by now a familiar fact—perhaps most evident in the medical field—that the advance of scientific knowledge yields, in many areas, new options which established frameworks of moral evaluation find difficult to handle. The extraordinary character of nuclear weapons has strained the boundaries of traditional structures of thought about the morality of war, just as about military significance and utility and about international law. Every possible course—including outright renunciation—has to face moral objections which by past standards and in isolation from alternatives might well have been deemed conclusive.

For someone of my personal background the natural starting-point for ethical appraisal is the body of concepts and criteria developed over a long period by Christian thinkers and known as 'Just War' doctrine. The rest of this Appendix is framed primarily in those terms; but broadly similar concepts are held to a substantial degree by people of other religions or value-systems, and indeed have secured a wide degree of shared international recognition (as is illustrated extensively in the diverse advisory opinions on nuclear weapons expressed in 1996 by members of the International Court of Justice).

Though early Christian practice and attitudes were substantially pacifist, mainstream theological and ethical thought through most of the Christian era progressively shaped an analysis seeking to establish for what reasons and under what conditions war could be tolerated morally. The resulting body of doctrine offered limiting principles both for the basis of undertaking war at all (*jus ad bellum*) and for how it might legitimately be conducted (*jus in bello*). The transformation caused by nuclear weapons put elements of this framework of appraisal under strain. Some commentators have claimed it as disallowing all possession and use of nuclear weapons; others have regarded it as made obsolete by a new environment which its progenitors could not have imagined.

Such opinions, on either side, viewed the classical theory too narrowly. It cannot be dismissed as a temporary construct rooted only in the particular times in which contributors to its development wrote; it is a careful elaboration, tested in discussion over centuries, of the concept of moral use of force and of how to apply to war ethical approaches which do not become dated. It was not however developed in cloistered abstraction from the world. Confronted by the universal phenomenon of war, the realities of human affairs and the injustices these often entail, the thinkers who built this tradition judged it not reasonable or realistic to demand that Christians renounce war regardless of what others (like Attila, or those spreading Islam by the sword) might do; and they then sought, within the framework of that judgement, to apply Christian ethical insights and criteria in disciplining recourse to war and the practice of war, rather than leave the effective use of force exclusively to the unjust. Such an approach reflects the true nature of much practical moral reasoning.

It is entirely consistent with the essence of the just-war tradition to come to the moral appraisal of nuclear weapons similarly—that is, by recognising that outright and unconditional condemnation of the deterrent possession of nuclear weapons, regardless of what others might do and for the rest of history (the tests which any absolute condemnation must face), would cut clean across practical moral commonsense; and thereafter by bringing to bear, from the tradition, the best disciplining insights available. This approach would seek to follow as closely as possible the timeless ethical principles underlying classical just-war theory, while recognising that nuclear weapons have so changed some basic concepts in warfare (like the meaning of victory and the relationship of particular operations to its pursuit) that a fresh look may be needed at some aspects of applying those principles.

It has sometimes been suggested that the ethical problems of squaring a deterrence posture that involves nuclear weapons with just-war concepts can simply be avoided, on the basis that the just-war approach relates to use of weapons, not mere possession; that deterrence differs from use, and indeed seeks to prevent any occasion for use; and that accordingly the moral evaluation of a deterrent structure in which nuclear weapons feature need not worry about just-war constraints and the problems they pose in the nuclear age. Such suggestions rest however, as pages 14-15 have explained, on a false disjuncture between possession and use. A deterrent stance is inescapably a statement—explicit or implicit, categoric or 'maybe'—about future eventualities, and about use. Unless it is a bluff or a lie, or the probability of deterrence breakdown is regarded as truly zero—and none of those positions is practically or morally sustainable—it must reflect a degree of willingness, however tacit, hedged or hesitant, to regard use as in some circumstances a genuine option. Accordingly, if we are to regard deterrence as ethically tolerable, we must have a basis for regarding use as conceivably legitimate.

The idea that in extreme circumstances nuclear weapons might legitimately be used has recurrently been assailed as incompatible with just-war doctrine in respect of both *jus ad bellum* and *jus in bello*.

Jus ad bellum enjoins that war should be embarked upon only if there is judged to be a reasonable chance of victory, and if the benefits are judged likely to exceed the harm resulting. Critics of nuclear weapons have argued that any war involving them must fail both these tests. But the criticism itself fails to recognise that the concept of victory, though much narrowed, can still have meaning, as pages 9-10 explain. It fails also to recognise that nuclear conflict is not a single, undifferentiated, catastrophic idea but could have many forms—in particular, that escalation is in no way sure (see pages 30-34). Given that, it is far from necessarily the case that the war-termination use of nuclear weapons would certainly yield a worse net outcome than submission to sweeping aggression by a political system like that of Hitler. Judgements on these matters would without question be terrible ones to face; but the conclusion does not have to be prescribed in advance, for all circumstances, exclusively in a single direction.

The harder questions arise under the heading of *jus in bello*. That segment of just-war doctrine enjoins that actions in war should always meet two key tests. The first is that of proportionality: the 'non-military' harm done must not be out of scale with the legitimate military objective - for example, it would not be allowable to saturation-bomb a large hospital in order to be sure of knocking out a single tank parked in its courtyard. The second is that of discrimination: war must not be conducted by means of attack on the innocent. 'Innocent' in this context means, with the original Latin, those not in any way involved in harming the adversary; it does not import a judgement about personal culpability. The reluctant conscript in the trenches opposite us may be wholly guiltless in his country's aggression, but we are entitled to make war on him because he is there to help do us harm.

There is no reason why 'war-termination' use of nuclear weapons must inescapably fall foul of these principles, though they properly bear upon particular choices about targeting policies for that purpose. The toughest issues relate to what, if anything, it can be legitimate to envisage by way of ultimate strategic strike—the final nuclear sanction that is implicit in a full deterrent structure. This sanction has to be potentially present, for without it the whole structure unravels; there is no anchor. War-termination use essentially says 'Desist, lest worse befall you'; and the 'worse' has therefore to be a possibility recognised on both sides as genuine, however remotely.

My view on this hard problem was set out as part of a personal commentary written in 1984¹ on the treatment of nuclear issues in a major Pastoral Letter—"The Challenge of Peace"—issued in the previous year by the Roman Catholic bishops of the United States. The argument there is without doubt at full stretch; so would be, at some point or another, the argument of any opposing position - that is in the nature of the conundrum set us by the nuclear *reductio ad absurdum*. In brief, it is possible to devise final-sanction nuclear-strike plans that might at the extreme—and that is all that legitimate possession for

deterrence strictly requires—be tolerable within the spirit of the just-war tradition. The central idea in such plans would be to inflict disabling damage upon the aggressor state as a state, so as to remove or emasculate its ability and disposition to persist as an evil force against others, while keeping as low as possible (appallingly grave though that would probably still be) the harm done to its innocent citizens. There is little doubt that in the earlier days of the nuclear age strategic targeting was not generally shaped in this way; but as time went on both US and UK planning options—French, Soviet and now Russian ones may be a different matter—moved significantly in this direction. Hypothetical and non-automatic action so framed, with the underlying concept being not to exact revenge but to yield a post-war situation better than might otherwise have prevailed, would offer a morally legitimate basis for deterrent possession and planning directed to keeping the entire eventuality hugely remote.

Notes

1. Published later in *Theological Studies* (Georgetown University), Vol. 48 No. 1, March 1987.