

## CHAPTER 9

### THE BRITISH EXPERIENCE

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#### PRE-HISTORY

For a mix of historical and geographical reasons, the United Kingdom brought to the nuclear revolution a security mindset differing in significant respects from that of the United States. The United States, behind its huge two-ocean moat, enjoyed (despite the outlying Pearl Harbor shock) a sense of continental sanctuary that in some degree endured, at least psychologically if not intellectually, until the impact of September 11, 2001. The combination of island configuration and dominant maritime power had for centuries given Britain a similar sense. With the advent of aircraft, however, able to overpass swiftly the short sea distances that separated Britain from the threats and turbulences of the rest of Europe, the experience of the two 20th-century world wars had unmistakably and irreversibly erased that sense.

In the First World War raids on England by Zeppelin airships began as early as January 1915. The vulnerability of these delivery vehicles led in time to their withdrawal from the bombardment role, but long-range fixed-wing aircraft subsequently entered the attack. Defensive attrition of all these efforts was severe. The direct damage inflicted, a few thousand civilian casualties, was modest in comparison with the carnage of the Western Front. But the disruption of industrial production and the diversion of air power into defence were significant, and the memory of attack lingered in public consciousness. It played some part in the widespread revulsion against the idea of war in the 1930s. The leading political figure of the time warned that "it is well for the man in the street to realise that there is no power on earth that can protect him from being bombed . . . the bomber will always get through."

The outbreak of World War II in 1939 did not immediately produce the huge homeland bombardment that was initially feared, but during 1940 and 1941 air attack—especially but by no means only

the "blitz" on London—became part of common experience. New dimensions were added in 1944, when attacks began first with the V.1 cruise missile and then with the V.2 ballistic missile. The scale of the damage received did not reach that inflicted upon Germany, or later upon Japan, but it nevertheless was formidable; about 50,000 civilians were killed.

As a result of the British experience of war from 1914 to 1945, the British people and their leaders entered the nuclear age with a vivid awareness of their inescapable vulnerability. At the same time, this awareness was less shocking, because it was less unfamiliar, than it was for the United States.

One other aspect of British experience should be noted. From 1940 until almost the end of the conflict in Europe in 1945, the strategic bombing offensive, primarily against Germany, had been a massive component of the British war effort. (There were heavier losses in action among Bomber Command aircrew in World War II than among British junior officers on the Western Front throughout World War I.) The value-for-resources-used, the impact, and even the morality of the offensive became subjects of debate in postwar appraisal. But the weight and salience of the effort at the time meant that awareness of the practical aspects and issues of long-range "homeland" attack—the realities of targeting, for example—was probably more widespread, not only among professional servicemen but also with political leaders and in public discourse, than in almost any other country. This awareness extended to a recognition (or belief) that such attack should be directed—rather like maritime blockade, a historic form of Britain's military leverage—to sapping an adversary's economic and social strength rather than directly assailing his armed forces.

## **EARLY YEARS**

In the immediate aftermath of August 1945, there were mixed views in Britain about the long-term significance of what had happened to Hiroshima and Nagasaki. Some military voices questioned its revolutionary significance, but air force leaders took a different view. In a remarkable letter in September 1945, only 2

months after succeeding Churchill in office, Prime Minister Clement Attlee argued to President Harry Truman that the new weapons represented a qualitative, not just a quantitative, change in the nature of warfare. Existing conceptions, he said, were now "completely out of date. . . . the only deterrent is the possibility of the victim of such an attack being able to retort on the victor." The idea of deterrence as the only protection against nuclear weapons dominated government thinking from then on, and so in large measure did the belief that the threat posed must be against the enemy's cities. The concern for nuclear-weapon-based deterrence moreover, almost from the outset of the postwar era, was given a sharper edge by perceptions that Soviet conventional-force preponderance in Europe was so massive that without prompt and all-out U.S. participation (not to be assumed until the North Atlantic Treaty Organization's (NATO) creation in 1949, and even thereafter not in prospect on a matching scale) a Soviet assault could reach the English Channel within weeks.

In January 1947, against the background of abrupt U.S. termination of its wartime cooperation on nuclear-weapon development, the UK Government (initially very secretly) made a formal decision to develop a capability of its own. There was, however, no possibility that such a capability could become operational with adequate delivery platforms and a significant stock of weapons before the mid-1950s, and for several years after 1947 there was no firm political guidance on the scale of force provision or the concepts of use. Even the Chiefs of Staff arrived at no clear consensus, despite considerable discussion. They recognized that severe limitations in intelligence about Soviet dispositions compounded the difficulties of any counterforce damage-limitation concept. They came also to accept—after higher initial hopes—that surface-to-air guided weapons did not offer, at least to a country in Britain's geographical situation, any expectation of success in warding off even a Soviet strike capability attenuated by attacks on its launching airfields.

Despite all this—and sitting oddly with its logic, at first look—there emerged at the end of the 1940s a disposition, especially within the Royal Air Force (RAF), to consider damage-limitation as well as counter-value targeting. The basis for this was a hypothesis that the United Kingdom would be participating in a very large combined

offensive alongside the United States, even though at this stage the United Kingdom knew virtually nothing of U.S. plans. Despite some low-key informal contacts, it was not until well into the 1950s that this ignorance began to be rectified. Within the concept of joint action, the RAF thinking was that, because of its greater proximity to the Soviet Union, the United Kingdom might have different targeting priorities from the United States, and that the V-Force—the *Valiant*, *Vulcan*, and *Victor* strategic bombers which were being developed—should therefore concentrate its attacks upon air bases from which the United Kingdom could most quickly be struck. A planning staff paper in 1954 envisaged that 40 such airfields should be targeted. These concepts continued into the 1960s and played a part in RAF planning for V-Force participation which was progressively incorporated from 1959 onwards into the U.S. Single Integrated Operational Plan (SIOP), with British officers stationed at Strategic Air Command Headquarters in Omaha. This thinking was reflected at ministerial level in a report made to the Cabinet in 1955 by Minister of Defence Selwyn Lloyd.

But starker realities continued to present themselves. In 1955, a major interdepartmental study concluded that as few as ten thermo-nuclear bombs could virtually destroy the United Kingdom as a functioning society, and the government's major *Defence White Paper* of early 1957 frankly avowed this profound vulnerability. (Judgments of this kind played a part throughout the Cold War. There was an acceptance of the idea that, although civil defense had protected the general population during World War II, its prospects of success in the nuclear age, for a country in the United Kingdom's circumstances, were too thin to warrant massive expenditure.) The implication for strategic targeting policy, that damage limitation was an unfruitful avenue to pursue, was clear. So too, however, seemed the parallel implication that even a modest UK force could inflict a grave wound upon the Soviet Union. Occasionally in official papers from 1952 onwards, there were statements that "superiority in numbers has no meaning" which belong to the same line of analysis. Nevertheless, the roles assigned to the V-Force in the joint SIOP had a hybrid character. It was envisaged that Bomber Command's 1959 capability should be allocated 69 city targets and 37 counterforce ones. In 1962 (when during the Cuban missile crisis all the Command's delivery

systems were brought to heightened readiness), the targeting figures shifted to 16 cities and 82 counterforce. (Even in national planning the notion of damage-limitation understandably died hard. As late as the final decade of the Cold War, the neutralization of Soviet fleet ballistic missile submarines (SSBNs) was still a factor in Royal Navy thinking on the size and tasking of its attack submarine [SSN] hunter-killer force.) However, it became increasingly clear that UK-only nuclear plans could not realistically aspire to damage-limitation effect. These plans had to be countervalue—that is, so everyone at this stage assumed, directed simply at large cities (as shortcomings in intelligence and delivery accuracy, in combination with limited holdings of weapons and delivery systems, effectively dictated).

The scale of countervalue capability evolved rather unsystematically. The original planned size of the V-Force, at 240 front-line aircraft, reflected a broad judgment—scarcely more than a gut feeling—of what would be perceived as a force substantial enough to command caution from the adversary and influence with the major ally. The imprecision of such a rationale made it difficult for the Air Ministry (until 1964 still a full department separate from the Ministry of Defence) to resist progressive cutback of plans to help ease the constant pressure which national economic difficulties imposed upon the defence budget, and frontline numbers never rose beyond 150 aircraft. This diminution, coupled with recognition of the difficulties which the aircraft would have in penetrating Soviet defences in a UK-only strike, steadily reduced assessments of how heavy a countervalue threat the force could pose. This was recognized even though in their heyday these aircraft were at least the equal of U.S. counterparts in most performance dimensions other than range. In the late 1950s, it was variously forecast in official appraisals that the aircraft could knock out (this being defined as inflicting 50 percent destruction) between 30 and 40 cities. By 1962 the figure was down to 15, although still including Moscow and Leningrad. Ministers took the view that this was adequate for the deterrent purpose. The Minister of Defence of the day indeed suggested that 10 would be enough, but the Cabinet settled upon 15 as the benchmark. Logic suggested, and it was occasionally attempted, to start with a judgment of the deterrent required and derive force level from that.



As the above summary indicates, however, the governing methodology amounted to assessing what the existing or intended force could do and then considering whether that sufficed.

Historians of the period have suggested that the differences of concept between a countervalue national plan and a contribution to the U.S. offensive that was at least partly counterforce shows a basic and continuing confusion of thought. For all the oscillation of discussion in the early 1950s, this criticism is not necessarily valid. There was no incompatibility, and therefore no practical need to choose, between having one concept for the UK-alone hypothesis and a different one for participation in a U.S. effort which, because of its massive scale, could have wider objectives. In internal governmental debate, the arguments in favor of maintaining a substantial capability veered between seeking a voice in U.S. plans and decisions and providing a last-resort independent insurance. In logic and practice neither of these justifications excluded the other, or pointed towards divergent provision. That said, by the time of the pivotal events of December 1962, serious thinkers both within and outside the government had come to recognize that the fundamental case for UK capability, and indicators for its character and scale, must be sought in hypotheses of independent action from which the United States stood aside. Though the existence of significant strategic offensive capability based in Britain might be of potential value to the United States by helping to complicate the task facing any Soviet first-strike aspirations, since Britain's eastward location posed an awkward operational dilemma for the Soviets: "simultaneous launch or simultaneous arrival?" In terms of strike weight, however, the U.S. armory was reaching a magnitude that rendered any UK contribution no more than an optional extra. Indeed, for wider reasons, significant elements within the Kennedy administration would have preferred to see the UK's capability fade away.

### **THE SHIFT TO SLBMS**

It had long been understood that V-Force penetrativity in the free-fall delivery mode would decline steadily as Soviet defenses improved. A stand-off air-launched missile code-named Blue Steel was developed and brought into service on a modest scale, but its

limited range and other shortcomings meant that it could not be seen as a long-term solution. A ground-based intermediate-range ballistic missile project, Blue Streak, was abandoned in 1960 largely because of the vulnerability of any land-based second-strike missile within a territory as small as the UK. In 1960 the Eisenhower administration undertook - subject to successful completion of development, which was not guaranteed - to make the *Skybolt* long-range air-launched ballistic missile available to the UK to prolong the life of the V-force. In late 1962, however, the United States decided to terminate the project. A tense meeting at Nassau in the Bahamas in December 1962 between President John Kennedy and Prime Minister Harold Macmillan yielded an agreement that the United States instead would sell to the United Kingdom *Polaris* submarine-launched ballistic missiles (SLBM) (initially envisaged to be the A.2 version, but in the end the A.3 version with three re-entry vehicles not independently targetable). It was envisioned that *Polaris* missiles would be installed in nuclear-propelled submarines designed and built by the United Kingdom.

If anyone in Britain doubted the inescapability of a countervalue targeting concept, this shift erased that doubt. The SSBN fleet—set at four boats, after an initial aspiration of five—could not be sure of sustaining on permanent operational patrol more than one boat with a load of 16 missiles. (Though there were often two boats at sea, and very occasionally three, UK planning always set its benchmarks by worst-case, no-warning scenarios.) Even if the A.3 missile had been capable of high-precision targeting, and even without allowance for a malfunctioning proportion, a salvo of this size could never hope to achieve a significant damage-limiting effect, or to cause enemy leaders any material concern about erosion of their offensive capability.

Almost from the moment the Nassau decision was announced, critics (in Britain and elsewhere) assailed it on the ground that reliance on the U.S. capability implied that UK nuclear independence had ceased to have reality. This had applied equally to the plan to acquire *Skybolt*. The answer to such criticism was (and remains) that the concept of independence has more than one legitimate interpretation, with different implications and markedly different price-tags. Given

the formidable size, diversity and quality of the U.S. inventory the strategic case for any ally to maintain a separate capability rested on a hypothesis that in some circumstances the U.S. armory might not be promptly available. If, hypothetically, the United States became deeply alienated and withdrew from its materiel-support commitments to its allies, the allies would need independence of procurement. Except for a few items, such as tanker aircraft, France chose this sort of independence, at high financial and opportunity cost within its defense budget. If, however, the hypothetical situation involved the United States merely being unwilling (or thought likely to be unwilling) to stand fully by its allies in time of acute crisis and mortal danger, a narrower form of insurance would suffice. Independence then need mean no more than the ability to make one's own operational decisions; that is, to be free to launch nuclear strikes whether or not the United States chose, or wished its allies, to do so. It was the latter form of independence, with its much lower costs and therefore less damaging repercussions on other aspects of defense effort, that United Kingdom decisionmakers saw themselves as choosing.

The first *Polaris*-carrying boat became operational in 1968. In the following year, the strategic nuclear role was formally transferred from the Royal Air Force to the Royal Navy. Some squadrons of V-bombers were kept in service until the early 1980s in a supplementary or "sub-strategic" nuclear role. Both the *Polaris* missiles and the remaining V-bombers were declared to NATO and notionally tasked by NATO military staffs in plans for General Nuclear Release, though amid the vast plethora of systems available there was a good deal of artificiality about finding targets to assign to them. For UK staffs, national plans that tasked *Polaris* in the countercity role were the prime focus of attention. The V-bombers also continued for some time to be seen for national purposes as simply participating in an all-out countercity assault. From 1967 onwards, NATO developed its flexible-response strategy, including the idea of carefully-limited nuclear strikes as an option to convey war-termination imperatives. In 1975 U.S. Secretary of Defense James Schlesinger presented a similar concept of Limited Nuclear Options for U.S. strategic forces. Such doctrines, however, were transmitted and absorbed



only slowly between UK policy and operational staffs. It was not until 1978 that their applicability was recognized and reflected in UK national plans for the V-bombers and for other aircraft that later offered deep-strike potential. (The national tasking of shorter-range aircraft and maritime systems equipped with UK nuclear weapons is not considered here.).

Though the *Polaris* force remained the United Kingdom's key strategic nuclear delivery resource until well into the 1990s, two issues soon impelled governments to reconsider the concepts and needs of deterrence. The first issue concerned what stance the United Kingdom should take, both in respect of its own direct interests and as a member of NATO, about the strategic arms limitation process which the United States and the Soviet Union began in 1969. The second—in some degree related—was how to deal with the threat to UK penetration capability posed by Soviet defenses against ballistic missiles.

The United Kingdom had concerns about the Strategic Arms Limitations Talks (SALT). The main ones were that the scale of its own modest force provision should not be "counted in" on the U.S. side; that the United States should not bind itself in any way that would constrain its future freedom to help allies again on the lines of previous cooperative acts such as the 1962 Nassau bargain, and that Soviet antiballistic missile (ABM) defences should be constrained to the lowest level attainable (ideally zero, though it was swiftly recognized that this was not on the cards). In the earlier years of the SALT/Strategic Arms Reduction Treaty (START) processes, UK staffs sought to think the issues through on a broader basis as a leading member of the collective Alliance and to provide a useful "second opinion" for the United States. The UK believed that (1) two-way deterrence, underpinned by manifest capability for mutual assured destruction not as preference but as ineluctable fact, had to be accepted; (2) the prime aim of the negotiations should be to maintain deterrence in as stable a form and at as low a cost as possible; (3) precise numerical equality in systems was not important at the magnitudes involved; and (4) attempts to establish neatly-symmetrical category-by-category equivalences amid the asymmetries of the East/West confrontation might damage NATO strategy and deterrence.

The soon-evident fact that the Soviet Union could not be convinced not to have ABM defenses around Moscow clearly affected the ability of the UK's *Polaris A.3* missiles to pose a threat to the Soviet capital. The A.3 missile was judged highly vulnerable to exo-atmospheric interception by the Soviet *Galosh* system, and the UK force was not large enough, especially in the one-boat case, to rely (as the United States always could) on saturating the defence shield, even at the 100-interceptor limit set by the 1972 ABM treaty. Discussion of what to do about this, and then of the development of countermeasures, was taken forward very secretly. The matter was closely held within government, and there was virtually no public debate or even awareness until an announcement was made in 1980, when the chosen countermeasure was close to entering operational service. Deliberations were premised on the assumption that the ability to target Moscow effectively ("the Moscow criterion") was important for deterrent credibility. The argument for action noted the constant possibility, at least in theory, that the Soviet Union might one day choose to break out of the ABM treaty to provide protection for a wider range of assets. Additionally, an exo-atmospheric ABM system (such as the Soviet Union had deployed) could generate a defended "footprint" (its precise size and shape depending on the azimuth and trajectory of incoming missiles) covering a much larger area than just the city of Moscow itself.

The solution chosen, code-named *Chevaline*, was to fit a much-changed front-end to the A.3 missile. The highly sophisticated technology incorporated in this new front-end aided penetration at the expense of reducing the warheads carried from three to two. The warheads were still not independently targetable. The project (designed and paid for by the United Kingdom, though it had some U.S. antecedents and U.S. industrial participation) was technically demanding and proved much more costly than was originally foreseen. As a result the need for it, and the related value placed upon the "Moscow criterion," was challenged. But the Government of Prime Minister James Callaghan decided against cancellation, partly because the disclosure of abandoning such a major endeavour in mid-development would detract from UK credibility in the nuclear field.

## *Trident*

Despite the imminence of the Chevaline improvement, it was evident by the end of the 1970s that, given project lead-times, the question of whether and how to replace the *Polaris* fleet could not be deferred. The arguments bearing upon the scale and character of threat capability needed for adequate deterrence in the UK-only setting ("second centre of decision") were revisited in internal Government studies more systematically than had been done at most earlier junctures, but without radical change of outcome in either the basic concept of countervalue strike or the order of magnitude judged necessary.

Though a substantial range of delivery system options was dutifully examined, the *Trident* sea-launched ballistic missile (SLBM) system emerged unsurprisingly as the clear preference, and in 1980 the United States agreed to sell it. Purely in weight of strike potential, the United Kingdom could have been content with less than *Trident* could offer, even in the C.4 version originally chosen (let alone the D.5 version to which the United Kingdom switched in early 1982, when it became clear that the United States was committed to proceeding with its acquisition and deployment). The original choice and the switch were driven in large measure by the long-term financial and logistic benefits of commonality with the United States. After the end of the Cold War, the United Kingdom announced a series of discretionary reductions in warhead load to well below what *Trident* was capable of carrying.

The 1980 decision to acquire *Trident* was explained in a special memorandum published by the Ministry of Defence (Defence Open Government Document 80/23). This is of particular interest for the present survey because it included the fullest—or, perhaps more accurately, the least meagre—statement made by any UK Government over the years about the sizing and targeting of strategic nuclear capability. The relevant section of the memorandum merits extended quotation:

### The "Second-Centre" Role:

9. If Britain is to meet effectively the deterrent purpose of providing a second centre of decisionmaking within the Alliance, our force has to be

visibly capable of posing a massive threat on its own. A force which could strike tellingly only if the United States also did so—which plainly relied, for example, on U.S. assent to its use, or on attenuation or distraction of Soviet defences by United States forces—would not achieve the purpose. We need to convince Soviet leaders that even if they thought that, at some critical point as a conflict developed, the United States would hold back, the British force could still inflict a blow so destructive that the penalty for aggression would have proved too high.

10. There is no way of calculating exactly how much destruction in prospect would suffice to deter. Clearly Britain need not have as much power as the United States. Overwhelming Britain would be a much smaller prize than overwhelming the United States, and a smaller prospective penalty could therefore suffice to tilt his assessment against starting aggression that would risk incurring the penalty. Indeed, one practical approach to judging how much deterrent power Britain needs is to consider what type and scale of damage Soviet leaders might think likely to leave them critically handicapped afterwards in continuing confrontation with a relatively unscathed United States.

11. The Soviet Union is a very large and powerful state, which has in the past demonstrated great national resilience and resolve. Its history, outlook, political doctrines, and planning all suggest that its view of how much destruction would constitute intolerable disaster might differ widely from that of most NATO countries. Appalling though any nuclear strike would be, the Government does not believe that our deterrent aim would be adequately met by a capability which offered only a low likelihood of striking home to key targets; or which posed the prospect of only a very small number of strikes; or which Soviet leaders could expect to ward off successfully from large areas of key importance to them. They might even be tempted to judge that if an opponent equipped himself with a force which had only a modest chance of inflicting intolerable damage there might be only a modest chance that he would have the resolve to use it at all.

12. Successive United Kingdom Governments have always declined to make public their nuclear targeting policy and plans, or to define precisely what minimum level of destructive capability they judged necessary for deterrence. The Government however thinks it right now to make clear that its concept of deterrence is concerned essentially with posing a potential threat to key aspects of Soviet state power. There might with changing conditions be more than one way of doing this, and some flexibility in contingency planning is appropriate. It would not be helpful to deterrence to define particular options further. The Government, however, regards the considerations noted in paragraphs 10 and 11 above as important factors in deciding the scale of capability we need.

The reference to posing a threat to "key aspects of Soviet state power" is worth noting since it signalled, even if lightly and indirectly, a new strand of thought in official utterances on strategic nuclear issues. The phrase was intended to imply targeting concepts which, while still countervalue and not promising to exempt cities or in particular Moscow, would not be exclusively or primarily directed at the destruction of cities. The impulse behind this was ethical, and reflected in some degree vigorous public debate in Britain on the moral tolerability of striking at populations. It was recognized within Government defence circles that *Polaris*—with high-yield warheads, not independently targetable, and mediocre accuracy—was not well-suited to providing more discriminate options, but that more flexible options might become available with the advent of *Trident*. Considerations of this kind continued to be voiced internally from time to time, but nothing further was said publicly, and it is not known outside Government how much adjustment of planning resulted.

#### AFTER THE COLD WAR

Since the end of the Cold War, there has been little debate about the United Kingdom's strategic nuclear capability. The capital investment in the *Trident* force was well-advanced by 1989, and nearing full commitment by the time the Soviet Union broke up. Argument over whether the United Kingdom should remain in the nuclear-deterrence business at all—against what possible adversaries, with what targeting concept—could have been stimulated afresh, but it had lost the impulsion of large savings available to be made or of new decisions forced upon public attention. Despite the longstanding antinuclear tradition on the Left, the incoming Labour Government excluded the *Trident* force (as it did no other component of the defence programme) from reexamination in its 1998 *Strategic Defence Review*. The Government, continuing the preceding Conservative government's initiatives without elaborating on strategic rationale, announced a reduction in the force's holding of operational warheads to 200 or less, with no more than one boatload of 48 warheads (that is, an average of three per missile) to be at sea at any one time. In

addition, the Government completed the phasing out of all other nuclear-weapon capabilities, and is configuring the *Trident* force to provide "substrategic" options. This has been conjectured to mean that some missiles might have only a single warhead, and that warhead might have reduced explosive yield.

The United Kingdom has declared, as have the United States and Russia, that its remaining nuclear weapons are not in normally targeted at anyone. No indication has been given of how they might be targeted—at what adversaries, against what types of objective—in time of crisis. Considerations of sparing populations that emerged in the 1980s are surely still prominent, but nothing has been said or is to be expected. It is likely that UK Governments would regard that as now even less necessary, and even more undesirable, than it was thought during most of the Cold War. "[I]t has been the preference of Governments to allow [adversaries] to draw their own conclusions rather than to describe precisely what our plans and capability would be in terms of targeting policy."<sup>1</sup> There is no basis for speculation on what contingency planning may secretly be undertaken within the Ministry of Defence or operational headquarters. It is possible, given now the very general "to-whom-it-may-concern" character of UK nuclear deterrence, that there is currently little or no such planning in specific terms.<sup>2</sup>

## ENDNOTES - CHAPTER 9

1. Ministry of Defence witness in evidence to House of Commons Defence Committee, November 4, 1980.

2. Under the "30-year rule" applying to the release of most categories of UK Government papers, files relating to the period up to the end of 1972 are available (though still with significant exceptions on continuing security grounds) in the National Archives. For most of this early period, the survey in this chapter draws extensively on the study of the files reflected in "Ambiguity and Deterrence: British Nuclear Strategy 1945-1964" by Professor John Baylis, Oxford: Clarendon Press, 1995. It is indebted also to the recollections of Mr. Peter Hudson, who occupied senior planning posts in the Air Ministry. UK strategic nuclear targeting policy beyond the 1960s is little discussed in the open literature, and, because of the sustained reticence of successive Governments, such material as exists is mostly either speculation or based on sources of uncertain authenticity. There is, however, a useful survey in Professor Lawrence Freedman, "British Nuclear Targeting," in *Strategic Nuclear Targeting*, Ball and Richelson, eds., Ithaca, NY: Cornell University Press, 1986, pp. 109-126.