ONE

Nuclear Weapons and National Purposes

Governments view nuclear weapons, like other components of military force, as instruments and symbols of power that can be manipulated to promote their interests. These interests may include protecting national sovereignty or the power of a ruling regime, enhancing diplomatic influence, protecting or extending economic interests, supporting allies, thwarting foes and potential foes, and generally bolstering national power and position within the hierarchy of nations. Nuclear weapons might, in some cases, also be thought to improve a government's ability to influence a particular situation by signaling its interest in an issue or geographical region, indicating its intention to participate actively in the resolution of a conflict or dispute, or projecting a national image that contributes to structuring the psychological environment of international diplomacy in a way that will maximize its interests. Those within a government who contemplate the acquisition of a nuclear capability will consider the extent to which it would contribute to or detract from these objectives and will weigh that against domestic political considerations and such countervailing factors as economic cost. Judgment about the utility of nuclear weapons for more narrowly military purposes would also be an important component of the choice, but would not likely dominate.

If national governments or the international community are to act effectively to impede the process of nuclear proliferation, these motivations for states to acquire nuclear weapons must be investigated and understood. What issues are likely to be dominant in a state's consideration of its nuclear option? Under what circumstances will states see their

primary interests promoted by a nuclear capability? And when will the opposite be the case? What are the means available to influence these perceptions? These are the primary questions that must be addressed in the formulation of a strategy to inhibit nuclear proliferation, and they form the basis for this analysis.

The possession of nuclear weapons by a state implies the threat and possibility of employing them in combat, but governments would prefer not to use them that way. Political objectives achieved by threat or coercion are preferable to the same outcome achieved by war. This is probably even truer in the nuclear context than with respect to the employment of conventional forces. A strong aversion to the use[1] of nuclear weapons has developed since 1945, when responsible American officials had few qualms about using nuclear weapons to destroy two Japanese cities. This aversion is shared not only by all current nuclear powers but also by non-nuclear states around the world. Some societies and their governments, whether for ethical, religious, humanitarian, or other reasons, simply do not regard rapid, concentrated, and extensive destruction as an acceptable instrument of policy. Others fear nuclear retaliation. All share a strong unwillingness to traverse a firmly entrenched behavioral barrier and thereby unleash powerful emotional and psychological forces that would lead to uncertain but potentially very dangerous results.

This aversion does not guarantee that nuclear weapons will never be used. Indeed, they might be. But that would constitute a failure of policy. Nuclear use, if it occurred, would probably result from an accident, a miscalculation, an unauthorized act of a military commander, or the military and emotional escalation of a crisis situation to the point where rational judgment was overwhelmed by panic or vindictive passion. As an outcome of systematic, rational planning, nuclear use seems very unlikely.

The reluctance to *use* nuclear weapons is, however, not directly

[1]The concept of nuclear *use* is a troublesome one. Nuclear weapons are, of course, used as threats, as instruments of power, and as protectors of various national interests without actually being detonated with destructive or coercive intent. If the term is employed with the former meanings, however, no convenient word is available to convey the latter meaning. For the purposes of this essay, the term *use of nuclear weapons* will always have the more limited meaning of detonation with destructive or coercive intent. The terms *political use* or *coercive use* will be employed to suggest uses that do not include detonation.

translatable into a reluctance on the part of non-nuclear states to *acquire* them. The most salient consideration in the choice of whether to obtain a nuclear capability will be its political, not its military, utility: that is, the extent to which the implied or explicit threats that are or can be associated with nuclear possession will be, on balance, beneficial in influencing the attitudes and actions of other states. But the reluctance to use nuclear weapons is not irrelevant to proliferation. Under most circumstances, national leaders are likely to favor the acquisition of nuclear weapons only if they do not think they will be drawn into actually using these weapons. A small number of beleaguered states might be most likely to acquire nuclear weapons or to acknowledge an existing capability precisely when they are most likely to use them to prevent their own destruction. But even they would be less willing to prepare for that contingency or at least to prepare for it openly if they thought that the likelihood of eventual use would thereby increase. To the extent that nuclear possession is perceived as likely to result in nuclear use, nuclear weapons are less attractive.

THE NATURE OF THE PROLIFERATED WORLD

But what of the likelihood of nuclear war in a world in which many more countries possess nuclear capability? Leaders of future nuclear states, disputing factions within such states, and even revolutionaries or terrorists might well share the aversion to nuclear use or at least calculate that their interest lies in acting as if they did. Command and control, communications, and physical security might be good enough to preclude accidents, miscalculations, unauthorized use, or theft. A proliferated world might be no more unstable against escalation to nuclear war than the current one; in fact, the risk of escalation to nuclear levels might serve to reduce the prevalence of conventional war. As the United States and the Soviet Union have found, the specter of nuclear conflagration usually encourages caution. In short, therefore, a proliferated world might be no more dangerous than our own.

But there is another possibility. Peoples, nations, and political leaders have sufficiently diverse cultural heritages and ideologies that there is no assurance that future leaders of nuclear states will not regard nuclear weapons as simply equivalent to other military instruments. Particularly as the memory of the horror of Hiroshima and Nagasaki fades, the

aversion to nuclear use may decline. With nuclear weapons available to large numbers of states, the opportunities for escalation of conventional conflict to nuclear war and for nonbelligerents in a conflict to use their own nuclear weapons to spark a so-called catalytic war may increase. At least the statistical probability of nuclear accident, miscalculation, or unauthorized use rises as the number of nuclear states increases. In the course of a violent national upheaval within an unstable nuclear state, military factions or revolutionary organizations might seize and subsequently use nuclear weapons. In a proliferated world, nuclear warfare might become thinkable, even commonplace, and perhaps also anonymous.

Individual judgments about the likely result of proliferation will differ, since no proposed theory of the future can be proven. While such judgments inevitably color views about the seriousness of proliferation and about what should be done to impede it, they do not provide a sufficient basis for determining policy. Equally important is the range of uncertainty around the best estimate. Even those who, like myself, conclude that the likely result of greater proliferation would be a world not much or perhaps any more prone to nuclear war than today's world must admit that the uncertainties are large and mostly involve the possibility of greater danger. The chances that proliferation will reduce the likelihood of nuclear war are quite small. The risks therefore, are large—large enough to preclude much serious advocacy of widespread proliferation, large enough to make worthwhile efforts to understand the underlying dynamics of nuclear proliferation and to seek means to inhibit it, and, most important, large enough to justify attention and preventive action by individual states and the international community.

Two possible patterns of proliferation appear to involve the greatest risks for nuclear use or war. The first is proliferation to particular categories of states. Those advanced industrial states, such as West Germany and Japan, that were the major sources of concern a decade or so ago are in fact probably the countries that involve the least risk. The greatest risks involve those states, such as Israel, South Africa, South Korea, and Taiwan, that confront major challenges to their borders, to the legitimacy of their regimes, or to their very existence as sovereign entities. In a seemingly hopeless situation their nuclear weapons might actually be used in an act of desperation. Another category of high-risk states includes those prone to terrorist activity or revolutionary change.

In these cases nuclear use by the government itself is of less concern than seizure and subsequent use by a variety of non-state entities. A final category includes states prone to autocratic rule by charismatic leaders who might not share the usual aversion to nuclear use or be sufficiently restrained by such institutional mechanisms as exist elsewhere.

The second dangerous possibility is proliferation at a rapid rate. The world could probably adjust to a moderate rate. But rapid proliferation could cause instabilities that might be too great for political systems and institutions to handle, making nuclear use or nuclear war more likely. Thus any strategy for nonproliferation should especially attempt to prevent a rapid spread of nuclear weapons and to avert acquisition by states in the high-risk categories.

Nuclear proliferation will also have important effects on world and regional stability for reasons not directly related to nuclear use. The mere possession of nuclear weapons by certain states could radically alter international perceptions and threaten global arrangements. If nuclear weapons were acquired by states such as Japan or West Germany, whose military capabilities and political allegiances were particularly salient to local security arrangements, by states that are unable or unwilling to build a secure deterrent force, or by states whose self-image and international role would thereby be radically and perhaps unpredictably altered, the result might well be greater uncertainty in political relationships, the unraveling of existing security arrangements, and decreased international political stability.

These changes, uncertainties, and instabilities would not necessarily lead to a nuclear way. They might or might not be considered undesirable. Today's major military and economic powers would almost certainly deem them detrimental. Those who benefit from the status quo naturally prefer stability and certainty to instability and uncertainty. Those who might expect to benefit from change, however, might think the potential gains outweigh the potential risks. New nuclear states, after all, might expect to find themselves more shielded from external challenge and therefore more secure. They might also acquire greater political power, which could be expected eventually to alter the distribution of global wealth in their favor.

These introductory comments notwithstanding, this study is not primarily an investigation of the *results* of nuclear proliferation. These will be considered only where they illuminate other subjects of more

immediate concern.[2] The main concern here will be to analyze the various incentives and disincentives—involving both security and political considerations—that will affect states' decisions about whether or not to acquire nuclear weapons.

THE NATURE OF PROLIFERATION

In the 32 years since the first nuclear test was made by the United States, 5 additional states have detonated nuclear devices; of these 6, all but India have developed and deployed rather impressive and costly, although quite different, nuclear weapons delivery capabilities. While there is no way to know how many more states have been prevented from acquiring nuclear weapons by their lack of technological or financial resources, there is no doubt that many states with all the necessary capabilities have chosen to refrain. Nuclear weapons have spread far more slowly than other military and most civilian technologies, including nuclear electricity generation. This record suggests that at least for most nations that have had available the means to develop or acquire nuclear weapons, either the incentives to do so have not been very strong or the disincentives have been stronger. Identifying the incentives and disincentives for the existing nuclear states and investigating whether a different pattern can be expected among potential proliferators will be the first task of this study.

The discussion will then turn to the means by which individual states and the international community can influence nuclear incentives and disincentives. The particularly important subject of the management of the international nuclear industry is addressed separately, followed by an analysis of nuclear acquisition, use, and threat by non-state entities. Finally, a general strategy for decreasing incentives and increasing disincentives is proposed and applied to four special categories of states. The strategy relies on the following policy instruments:

- Maintaining or strengthening existing security guarantees and extending them when appropriate

[2]In a forthcoming 1980s Project volume, David Gompert will explore the question of what a world with widespread proliferation might be like and how it ought to be managed.

- Working to resolve or stabilize regional disputes that might stimulate proliferation
- Strengthening the international behavioral norm against the acquisition of nuclear weapons
- Acting through international markets to dissuade states from acquiring their own sensitive nuclear facilities
- Replacing technical and economic barriers against access to nuclear materials with institutional and political barriers against using those materials to make weapons
- Reducing the prestige and symbolic importance of nuclear weapons in world politics
- In special cases, satisfying some of the ambitions of near-nuclear or potential nuclear states or non-state entities
- Applying moral suasion to potential proliferators
- Physicially protecting weapons and weapons material
- Actively suppressing nuclear-prone, non-state entities.

First, though, the term *nuclear proliferation* must be defined. For purposes of this discussion, a state will be considered to have acquired nuclear weapons only if it has unambiguously convinced the world that it has done so. To date, a nuclear detonation has been the standard signal. In the future, however, an official declaration of possession by some states might be equally convincing. An avowed peaceful nuclear detonation such as India's would still demonstrate a weapons capability, since so-called peaceful nuclear explosives (PNEs) are technically indistinguishable from explosives that can be used for or developed into military weapons. A nuclear detonation is a dramatic, unequivocal, and irrevocable threshold act. It will serve as the functional definition of nuclear proliferation for the purposes of this paper.

It is, however, far from the whole story. A state can gain political benefits (or incur political costs) from a potential nuclear weapons capability as well as from a demonstrated capability. Any state with a large industrial infrastructure and many highly trained scientific and technical personnel has an obvious nuclear potential and in a few years could acquire weapons-grade materials for fabricating and testing an explosive. In the past, concern has largely been focused on such states.

More recently, however, attention has been directed toward states with medium or very modest scientific and industrial infrastructures. Even they can gain credibility as potential nuclear states, though not without considerable cost.

Such states could gradually acquire a civilian nuclear industry oriented toward electric power generation. In this way personnel would receive training in nuclear technologies and in handling nuclear materials. If spent reactor fuel was not exported, the result would be a gradually growing national inventory of plutonium that could, if removed from the spent fuel, be used to manufacture explosives. If the industry included an indigenous fuel reprocessing plant, or if fuel were reprocessed elsewhere and the fissile material returned, an inventory of readily available plutonium would be accumulated. If a uranium enrichment plant were acquired, another potential means of acquiring weapons-grade material would be available. The existence of trained personnel and of an accessible plutonium stockpile or uranium enrichment facilities would significantly reduce the lead time necessary to build a nuclear explosive once the decision was made to do so. This universally recognized fact infuses political significance into a state's decision to develop a nuclear power program. The anticipation of future weapons capability will have a significant effect on present attitudes of others.

A state with a strong scientific-industrial base or a growing nuclear industry can pursue an interesting strategy. It can hint subtly or openly that it already has nuclear weapons or a weapons development program, or it can suggest that it wants or intends to develop nuclear weapons. If it were inconceivable that the state could acquire materials and assemble the technical expertise needed to fabricate explosives, hints of this sort would have little or no political value. But once hints became credible, they could provide many of the potential advantages of a real capability with few of the liabilities. To the extent that other governments might wish to discourage the carrying out of the threat implied by credible hints, the hints themselves could become instruments of coercion or deterrence. Israel has been using such hints that way for years. If, as seems likely, increasing numbers of states come to pursue a similar strategy, a new and unsettling variety of uncertainty will be introduced into the international system.

A state that really wants an actual nuclear weapons capability could rely on a nuclear power industry as a source of weapons-grade fissile

materials. It is not likely to do so, however, at least until reactors now under development which use weapons-grade materials for fuel or produce better-grade plutonium come into widespread use. The uranium use for fuel in current power reactors is insufficiently enriched in fissile isotopes to be used for weapons. Plutonium produced in the normal operation of these reactors could be used for explosives but has a lower content of fissile material than a weapons designer would ideally like. Its use would require more care and would result in lower yield and efficiency. Current power reactors could produce better-quality plutonium, but only by greatly reducing the amount of electricity generated. Another cost of such a policy might be a bureaucratic conflict between the weapons designers and the electric power utility operators, who would be loath to accept the required inefficiencies. Perhaps more important, diversion from a nuclear power industry would, for most states, have political drawbacks: the risks of detection by safeguards mechanisms or the cost of abrogating or ignoring safeguards agreements.

There is a much cheaper and easier route for most states, with or without a nuclear power industry, to obtain high-quality plutonium within 5 to 15 years. The time required would depend on the technical and industrial base of the country when the program was initiated. There are two requirements: one or more modest-sized, rather simply designed, heavy-water or graphite-moderated nuclear reactors using natural uranium fuel in a straightforward fuel assembly; and a small fuel reprocessing plant designed to extract plutonium at a rather high level of chemical purity from low-burnup, low-radioactive fuel. These requirements are far more modest than a commercial power reactor and a reprocessing plant designed to extract extremely high purity plutonium and uranium from very radioactive power reactor fuel. The existence of this opportunity is extremely important and not well appreciated by the general public, by many students of the proliferation problem, and even by planners in many potential nuclear states. The common assumption that barring theft or purchase, weapons-grade materials can only be or would most likely be acquired through a civilian nuclear power program is simply wrong. Relying on a plutonium production reactor and an unsophisticated reprocessing facility dedicated to a weapons program would be much quicker, easier, and cheaper.

The evolution of uranium enrichment technology could make available another straightforward route, this time to a uranium weapon.

But given the current state of technology, this would probably not be the chosen method for at least the next 5 to 10 years.

Even if weapons-grade material were available to a potential proliferant, an explosive device would still have to be produced. The difficulty of this task would depend on the quality and quantity of the plutonium available and the yield and efficiency of the weapon desired. Assuming that sufficient quantities of high-quality plutonium were available from the sort of dedicated facilities described, fabrication of an inefficient, low-yield explosive would be well within the resources of most states. A first nuclear detonation is not necessarily equivalent to or a demonstration of an actual weapons capability, however. Designing and building an efficient and deliverable weapon is considerably more difficult than creating a nuclear explosion. Whether a state would be satisfied with a crude explosive or instead feel that nothing short of an efficient and easily transportable weapon was worthwhile would depend on the objectives that the program was intended to serve. The number of nuclear tests required to provide confidence in the design of a true military weapon or to develop a number of different weapons tailored to particular functions would depend on the technical sophistication of the weapons designers. Independent of the technical requirements, the rate of testing also could be used as a political signal of intent and commitment to the development of a nuclear arsenal.

Nuclear weapons themselves have little military value and somewhat limited political value unless they can be delivered to a designated target. Any country can deliver a nuclear explosive by putting it in a railroad car or on a ship and moving it to an appropriate location. While this method may serve for some purposes as a perfectly satisfactory means of delivery and does provide any state possessing nuclear explosives with some credibility as an actual nuclear power, its political utility is much less than that of tailored military delivery systems. These can be distinguished by their ability to penetrate defenses, to strike at various ranges, to survive conventional or nuclear attacks, and to respond under various circumstances and against different target sets.

The incentives and disincentives for developing these various levels of capability will not be evaluated here in detail. States with only limited political objectives might be quite satisfied with a few nuclear tests and little or no investment in actual weapons or delivery systems. The cost of their nuclear programs would be quite modest. Other states, however,

will want an actual weapons capability, perhaps because they think the benefits they seek from a nuclear program require the creation of a credible military force. For them the cost might be very high and would depend on the size of the force required; the range and design of delivery systems chosen; and the attention paid to command, control, and security.

The context within which any government thinks about exercising a nuclear option will be unique. The complex evaluative and decision-making process through which the many incentives and disincentives to acquire nuclear weapons are considered, judged, integrated, and argued about will be different in both structure and procedure for every state. In fact, the differences among national processes and institutions might well affect the decisions reached by particular governments. The only characteristic shared by all governments is the struggle of a central decision-making authority to control a large number of compartmentalized bureaucratic entities with disparate outlooks and, often, conflicting interests. Although for simplicity's sake the following discussion will frequently treat a state as a single utility-maximizing entity with attributes that actually reside only in people, the reader should not forget that this approach only approximates reality. It is, however, a useful approximation, since this study is primarily interested in the ultimate compromise or consensus achieved through intragovernmental deliberations—a combined view that may, for all practical purposes, be considered the view of the government or of the state.

Uniqueness is important in other respects as well. Every state's local and regional security concerns, its alliances or tensions with other states, its leaders' proclivity for caution or for risk taking, and its ambitions for enhanced political, economic, or military power will influence its decisions. While adopting the perspective of individual governments or their component parts, this discussion will not provide the detailed, country-specific analyses that would be required to reach informed judgments about the likelihood of particular states' acquiring nuclear weapons.[3] Analysis at the level of generality employed here does not lead to conclusions or predictions about which or even how many states will be nuclear in a given period of years or how that number can be changed by

[3]For such an analysis see George H. Quester, *The Politics of Nuclear Proliferation*, The Johns Hopkins Press, Baltimore, Md., 1973.

the exercise of recommended policy instruments. Ultimately, separate policy choices must be made with respect to each potential nuclear state. Fortunately the number of candidates is not yet so high as to overwhelm the analytical and decision-making capacity of governments. The present analysis should be useful in thinking about those choices and should provide insight into what to look for in detailed, state-specific analyses.

TWO

Security Objectives

Every government must strive to protect its territory from invasion or annexation, its sovereign independence from military or political challenge, and its interests from external threat. Some governments must also guard themselves against organized groups of their own subjects who seek their overthrow. Such efforts undertaken by a state to preserve and protect the status quo will be called *security objectives* for the purposes of this study. A state's own efforts to change the status quo—whether to increase its human, natural, or financial resources or to extend its power and influence—and whether or not it uses military force to do so, will be discussed below as *political objectives*.

Few governments either perceive no significant external challenge to their security interests or are content to rely for their protection on diplomacy or external security guarantees unsupported by their own military forces. Most governments have found a military establishment useful in supporting their political and diplomatic efforts and, when necessary, in fighting to defend sovereignty, territory, prerogative, or interest. Of the six current nuclear powers, only India has not readily admitted that it saw nuclear weapons as valuable additions to conventional military forces for pursuing security objectives and that this perception was an important motivation for developing a nuclear capability.

The extent to which security interests encourage or discourage the acquisition of nuclear weapons can best be examined by distinguishing between (1) essentially regional security interests and (2) security interests that derive from the possibility of confrontation with major

military powers with global interests. Regional security interests include protection against challenges by neighboring or regional states that seek to revise territorial boundaries, that impede traditional passage over land or through ocean straits, or that seek to overthrow a government or interfere with its activities. Saudi Arabia's security problems with respect to Iraq or Israel, South Africa's anxiety about a challenge from black Africa, Taiwan's concerns with China, or Colombia's military competition with Venezuela are all examples of regional security issues.

Global security interests include the possibility of challenges, either direct or through interference in regional or domestic affairs, by global military powers. Examples are Saudi Arabia's or African states' apprehensions about the Soviet Union, the United States, and perhaps Western European states; Eastern Europe's concerns with the Soviet Union; and Caribbean or South American countries' anxiety about American intervention. The Soviet Union's threat to Japan appears to pose a regional security problem because of the two countries' geographic proximity, but the problem is more accurately considered global because both countries have worldwide interests at stake.

Another important security interest, that of general international stability, really fits into neither category. Many states do not feel imminent or serious security threats and, whether or not they are part of an alliance system, consider the overall climate and stability of their geographical region or the international system as their primary security interest. Canada, Sweden, Switzerland, and many countries in Latin America and the Pacific fall into this category. Security considerations offer them no incentives to acquire nuclear weapons; in fact, to the extent that their going nuclear would encourage others to do so, they feel a strong disincentive. They see a strategy of nonproliferation as a way to prevent the deterioration of global and regional arrangements conducive to their own security. Their attitudes are not based so much upon moral rectitude as upon perceptions of long-term self-interest.

REGIONAL SECURITY INTERESTS

Many non-nuclear states face problems of national security within their regions which seem likely to provide the major incentives for developing nuclear weapons. Whether in the Middle East, South America, Southeast Asia, Africa, or the Asian subcontinent, the major threat to

most governments, other than from domestic dissidents and revolutionaries, is from nearby states. For many states, these regional threats provide the overriding, although not the only, motivation to build and strengthen conventional forces. They do not, however, always translate into incentives to obtain nuclear weapons; in fact, they sometimes translate into disincentives. The present task is to identify why regional security considerations make some states see nuclear weapons as an asset and others see them as a liability.

In a bilateral or regional conflict in which no state possesses nuclear weapons, the more vulnerable state(s) would appear to have the greater incentive to obtain a nuclear capability or to hint at that possibility. Their enormous destructive power makes nuclear weapons appear to many to be military equalizers. If not equalizers, they could at least be expected to assist a challenged state in protecting the status quo. A state with a reasonably high level technical-industrial base and modest delivery capability could relatively quickly and inexpensively acquire nuclear weapons as a way to increase very significantly its available military power. Even were other states to respond by going nuclear themselves, the weaker state might still be, or perceive itself to be, less unequal and more secure than under the previous conventional imbalance.

However, since nuclear weapons are not likely to be considered usable military forces, this might not always be true. Nations that see themselves as weak and threatened must judge whether the acquisition of nuclear weapons or hints of such acquisition are more likely to deter potential opponents—and if so, what level of forces, deployed how, would deter what sort of threatening military or political actions—than to stimulate, for example, the initiation of preventive war. An embryonic nuclear force is likely to be small, vulnerable, and a tempting target for preemptive attack by nuclear or, more likely, conventional forces. Command and control systems must be developed, and national leaders must gain experience in dealing with them. Indeed, the prospect of great instability and risk of conflict during the period of transition from non-nuclear to nuclear status might dissuade weaker states from acquiring nuclear weapons. Moreover, the weaker states would have to assume that their adversaries would also acquire nuclear weapons. The previous unequal balance might then be restored or be made more unequal, but at an even higher level of potential violence.

Sometimes, as in the Middle East and southern Africa, weaker states

challenge a status quo protected by a regionally dominant power. Their superior military power does not shield regionally dominant states from the possibility of repeated wars or provocation. Wars can be quite limited in extent or can be fought by a surrogate revolutionary or guerrilla organization; indeed, even full-scale wars normally are fought for political objectives and rarely progress to total defeat. Thus dominant powers in such instances might decide that nuclear weapons, either hinted at or actually deployed with signals that they might be used, would deter provocation and war more effectively than conventional forces.

Or, a regionally dominant state might be concerned that its own nuclear program might encourage its adversaries to follow suit and that both the unstable transition period and the final equilibrium might be even more unfavorable than the previous situation. The state would fear losing the clear military superiority it enjoyed or was achieving before the introduction of nuclear weapons. Such concerns on the part of a regionally dominant or potentially dominant state not under direct challenge would weigh heavily against nuclear ambitions. The state also might lack the confidence that other governments that had been stimulated into a nuclear program would be willing or able to take the necessary precautions to prevent unauthorized use. These considerations would be particularly relevant to Iran, Brazil, and perhaps eventually to an emerging dominant power in black Africa.

The case of a long-standing confrontation or competition between non-nuclear states in which one discovers that the other is developing or has developed nuclear weapons may be no less uncertain, but for different reasons. If the non-nuclear state could possibly keep pace with or catch up with the state initiating the nuclear competition, the incentive to do so would probably be very strong. Acquisition by either Argentina or Brazil, Indonesia or Australia, or North or South Korea would likely spur the other to follow suit rapidly. Where the prospects are low for keeping pace with or catching up with the nuclear program of a regional rival, the incentive to try may be lower. In either case, the response of a state to the introduction of nuclear weapons into its region will depend importantly on its expectations of how its adversary will put its capability to use and on the availability of political and military alliances with global powers. How Pakistan, for example, will weigh these factors remains to be seen.

Even if there were no evidence of an actual weapons program, a government that believed its regional rival would inevitably acquire a

nuclear capability might feel compelled to begin its own program. It might attempt to achieve a nuclear capability first, to start a more gradual program designed to keep pace with but not overly stimulate the rival's activities, or to develop a civilian nuclear program that would reduce the lead time following a future decision. Each of these programs could be secret or open, depending on the signals that the country wished to send to its rival, its allies, and perhaps its suppliers of nuclear equipment and technology. Because of the possibility of such an anticipatory response by one government to a rival's expected intentions, any state with a nuclear power program but no plans for either a weapons program or a policy of credible hints would be well advised to persuade others forthrightly of its own good intentions. Rivals might otherwise mutually and perhaps unwittingly reinforce each other's nuclear propensities because of ambiguity and misperceptions; Argentina and Brazil might well be doing this now. Indonesia and Australia could become involved in a similar vicious circle in the future.

Any state engaged in a border dispute or regional confrontation with a nuclear-armed state would have an incentive to develop its own nuclear capability. The purposes would be both to neutralize the political and military advantage of the opponent's nuclear weapons and to deter attack by conventional forces. While the credibility of a nuclear response to a conventional attack would vary from one instance to another, the uncertainty itself would be an important deterrent. A potential attacker could not be sure that a conventional incursion would not be met with nuclear resistance or retaliation. This incentive is probably quite strong in a case such as India vis-à-vis China or perhaps Iran vis-à-vis India, where both antagonists have nearly equal conventional military power and have similar, competitive political ambitions. In the absence of American security guarantees, this motivation might be decisive in causing Taiwan to develop nuclear capability.

There is a countervailing argument, however. A state in conflict with a nuclear power and unprotected by alliances with another nuclear power might feel, at least until it had deployed a secure second-strike capability, that a nuclear capability might only encourage a preemptive nuclear attack. An adversary might be less reluctant to launch a nuclear attack against a nuclear opponent it could disable than against a non-nuclear state. Nonetheless, since the threat of such an attack would probably not be very credible, this argument is not likely to be decisive. In cases where it would apply, its effect might be to encourage a

clandestine nuclear program accompanied by hints rather than an overt program accompanied by threats.

The leaders of a state whose regional security is likely to deteriorate over the years might see the development of nuclear weapons as a way to counteract hostile forces and arrest or reverse the deterioration. Two particular sets of circumstances that might lead to this conclusion by a government are worth identifying. In one instance a state might face gradual but seemingly relentless political isolation within the international community as well as forces that seek to overthrow its government. South Africa, Rhodesia, and Taiwan fit this description. Except for its American support, Israel, too, could qualify. These states would probably not want to use nuclear weapons, but rather would see the uncertainty and changed psychological environment that resulted from their acquisition as sufficient to deter hostile acts by opponents. They might also expect nuclear possession to encourage external powers to intervene in a way that would protect the status quo. But acquiring nuclear weapons might lead to near-total isolation and greater pressure from adversaries who might either initiate their own nuclear programs or be less reluctant to employ nuclear threats. The great danger of these states' acquiring nuclear weapons derives from the possibility that if nuclear deterrence were to fail, the beleaguered government might find itself losing a conventional war without any hope of outside assistance. It might then use its nuclear arsenal out of desperation. These various disadvantages of nuclear weapons might encourage isolated and besieged states to eschew an overt nuclear program and adopt instead a strategy of credible hinting. Israel openly pursues that course; Taiwan and South Africa may follow suit.

The second set of circumstances in which governmental perception of long-term deterioration of a state's regional security position could be a powerful incentive to its going nuclear is that of the unraveling of existing alliances and security guarantees. Especially if a government had depended on a pledge of ultimate protection with nuclear weapons, any weakening in that guarantee, whether real or perceived, could prompt a decision to secure its own defense by producing nuclear weapons. But the same analysis would apply where security guarantees did not involve a nuclear umbrella. Whether because of official disillusionment or public sentiment, a weakening of American security guarantees to, for example, Pakistan, Iran, Australia, or South Korea could stimulate significant domestic pressure to acquire nuclear

weapons. The withdrawal of foreign-based troops or tactical nuclear weapons from a state without its government's prior and willing consent could also cause this reaction, as it would in South Korea, for example. The incentives here seem so strong that they should figure prominently in any American assessment of alliance commitments and force deployments.

Nuclear weapons might sometimes be considered alternatives to conventional weapons. Particularly if a state cannot either afford to buy the conventional weapons it thinks it needs or find a willing supplier, it might turn to nuclear weapons. These could be deliverable by fairly unsophisticated means and could in fact be faster, easier, and cheaper for a state to build itself than the sort of advanced conventional hardware that would be required to provide any reasonable capability against a well-armed adversary. Since states do not normally expect to use nuclear weapons, however, potential proliferators would usually view them as additions rather than alternatives to conventional forces.

A domestic tradition of violent political change or of military intervention in national politics might also discourage a government from acquiring nuclear weapons. The government of a nation with such a tradition might be unsure of its ability to control nuclear weapons or prevent them from falling into the hands of political opponents or dissident military factions who could find them a significant source of power or even a usable instrument during an attempted coup d'état. It may also be uncertain of its ability to prevent the military from turning a first test or a modest test program into a significant military capability. In either case, the government might be somewhat reluctant to exercise the weapons option in the first place. Alternatively, national leaders in such countries might feel confident, perhaps incorrectly, that they could control their military and deployed nuclear weapons, but still might not trust the ability to do so of their possible successors. The extent to which this perception might be a restraining influence is highly uncertain. National leaders sometimes prefer to enhance their own power and prestige rather than protect the long-term interests of their country.

It is unlikely, as will be explained further below, that a small terrorist group or even a large revolutionary movement would seek to obtain nuclear weapons. Nonetheless, the possibility that such a non-state entity might steal nuclear weapons or material or threaten to use them against the state would doubtless damp the nuclear enthusiasm of governments unable to control revolutionary or terrorist groups within or

near their borders. If a non-state group were known or suspected to have obtained nuclear weapons or significant amounts of weapons-grade material, a state might react with a nuclear weapons program of its own. Whether it would do so depends on the nature of the suspected non-state entity, other states' responses to the nuclear threat, and the implications of a nuclear response for relations with other states.

A nuclear response to a nuclear urban guerrilla group would be inappropriate and useless. Other responses, more closely resembling very strong police action, would be necessary. A nuclear response to a large, nationally oriented revolutionary movement operating out of a well-identified geographical area might be equally reasonable or unreasonable as responding in kind to the nuclear program of a hostile neighbor. In the case of a non-state entity, however, other states, particularly those who had traditionally aided and abetted the group, might react to their client's nuclear activity by removing their support and thereby guaranteeing the group's elimination as a significant threat without the affected state's having to go nuclear. Particularly if the target state could achieve nuclear capability rapidly, supporters of the non-state group would have a major incentive to prevent it from acquiring nuclear weapons at all.

GLOBAL SECURITY INTERESTS

There are basically two sorts of global security interests: first, the desire to deter or protect against threats or military incursions by major powers with global interests, particularly the United States and the Soviet Union; second, the aim of increasing or decreasing the involvement of the superpowers in regional disputes and power balances.

Military intervention by nuclear states in non-nuclear states has been sufficiently common that many of the latter may be concerned about deterring such intervention in the future. Non-nuclear states would not be concerned primarily with deterring the use of nuclear weapons against them, although such use has been threatened on various occasions. The general aversion to nuclear use along with the usual adequacy of large-scale conventional power makes nuclear use against non-nuclear states barely credible today. The more important issue is the employment by formerly non-nuclear states of nuclear weapons for deterrence of military intervention or of coercion with conventional forces.

Such nuclear deterrence might be effective only in circumstances in which the deterring state might plausibly be willing to use nuclear weapons for defense or retaliation. Nuclear defense would present few such circumstances because any government would be naturally reluctant to detonate nuclear weapons in or near its own territory. Even where geography and population density would make nuclear defense plausible, a government might still refrain because of the possibility that opponents may, in fact, be willing to put their expeditionary forces at risk or that these forces might themselves be nuclear-armed or assisted. The threat of nuclear retaliation in the face of conventional aggression would require a credible way to deliver warheads to a superpower's homeland. Even a commercial aircraft might suffice. Nonetheless, the prospect of a devastating nuclear counterretaliation by the superpower would probably deter the threatened state from escalating to nuclear conflict or even from seeing nuclear use as a potentially interesting option.

Although nuclear defense or retaliation against a superpower, and therefore nuclear deterrence of actions by a superpower, would not be particularly credible, the additional element of uncertainty introduced by nuclear possession should not be underestimated. Rarely are superpower interests challenged sufficiently by small states to warrant even a small risk of nuclear retaliation against either expeditionary forces or homeland. Therefore the possession of nuclear weapons by small- or medium-size states would probably serve as an effective deterrent against direct military intervention by a superpower, and states concerned about such intervention might find that option attractive.

Many states that are or feel threatened by a superpower are currently protected by an alliance with the other superpower. American allies in Western Europe and Japan and Soviet allies in Eastern Europe and Cuba are examples. The weakening of the superpower's guarantees to the governments of these states would affect their nuclear incentives no less than would the weakening of guarantees to states that are threatened by nonsuperpowers. Indeed, at least in Japan and West Germany, in the absence of American security guarantees, the domestic forces arguing for indigenous nuclear capability would probably be much stronger.

Whether the nuclearization of a regional dispute or power balance will tend to draw the superpowers in or to encourage them to steer clear is doubly ambiguous. In general, the introduction of nuclear weapons seems likely to reduce the chances that the United States or the Soviet

Union would seek unilateral advantage from local conflict and to increase the probability that they would intervene to defuse tensions. But circumstances can be imagined in which the opposite might be true. The emergence of a new nuclear power might encourage a superpower to participate actively in regional power balances in order either to gain the advantage of alliance with that state or to counter its increasing influence and power. Further, any set of expectations about the superpowers' reactions can have various consequences: it might act as a nuclear incentive, be a disincentive, or even have both effects. Israel, for example, might fear that the nuclearization of the Middle East would prompt the superpowers to impose a settlement inimical to its interest. It might also anticipate with approval action by the superpowers to prevent the outbreak of another war. Arab states, in contrast, might have precisely the opposite reaction.

RESERVATIONS AND CONCLUSIONS

Three factors ought to qualify the preceding arguments. First, complex strategic analysis of this sort may simply not be relevant to some decision makers who are unaccustomed to thinking in this way or who respond to more visceral instincts. Second, security incentives and disincentives may be perceived differently by different parts of a government. In some instances, the military or atomic energy bureaucracies might be able to move their country toward nuclear status, independent of their leaders' desires. Third, the relative significance of long- and short-term factors is unpredictable. The temporary political or military advantage of being the first and only nuclear power in a region might overshadow the more enduring problems of being only one of several nuclear powers. The planning horizon for most governments is at most 5 to 10 years, a time that may be shorter than would be required for regional adversaries to react by developing their own nuclear capability. Regionally dominant states in particular probably need less time and effort to develop nuclear weapons than do their less powerful neighbors and adversaries. To the extent that India's security problems vis-à-vis Pakistan motivated its nuclear program, for example, its perceptions of immediate advantages seem to have eclipsed the more abiding dangers inherent in Pakistan's own nuclear potential.

Notwithstanding these reservations, some tentative conclusions are

possible. Those states that so far have been most capable of developing nuclear weapons appear in general to have the fewest security incentives for doing so. The United States, the Soviet Union, China, and perhaps India have been exceptions, but for the latter three security was by no means the sole incentive. Other states, such as Japan, Canada, Australia, and several European countries, with the technical skills and financial resources to build weapons have not felt strong incentives to do so and have refrained. Their alliances and available conventional weapons have enabled them to deal adequately with any serious threats to their security that they have perceived since World War II. The nuclear umbrella of the United States and to a lesser extent those of Britain and France have protected other NATO states and Japan; the Soviet Union has protected the Warsaw Pact states.

In contrast, the security disincentives for at least some of these states have been strong. Given their involvement in rather stable alliance systems, their dependence on American or Soviet goodwill, and their reluctance to stimulate others to go nuclear, Japanese, Australians, West Germans, Canadians, Italians, Swedes, Swiss, Czechs, Hungarians, and East Germans probably have calculated that nuclear weapons are more likely to decrease their security than to improve it. Unless current security arrangements in Europe and Asia begin to unravel, their assessments of their security will probably not change. Of course, incentives and disincentives of a nonsecurity nature also are important in determining the prospects for proliferation. For Britain, France, and India, for example, the decision to go nuclear was probably determined primarily by political rather than security interests.

For other governments, the security incentives in general seem stronger. Many of these states are involved in serious regional disputes or political competition. Few have the security of firm alliances with nuclear powers. Those that do seem increasingly less willing or able to rely on them. Several have experienced superpower intervention or have reason to fear it in the future. The fact that so few states have to date developed nuclear weapons is probably attributable to the strength of the security disincentives already discussed, the strength of other disincentives to be addressed below, and most nations' lack of capability thus far to build weapons. As these capabilities inevitably improve, compensating action will be required to strengthen disincentives and weaken incentives.