FINAL REPORT

# Trends in Nuclear Proliferation, 1975-1995

PROJECTIONS, PROBLEMS, and POLICY OPTIONS

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HI-2336/3-RR

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POLICY RESEARCH
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The projections developed in Section II of this report do not constitute predictions. They are designed to facilitate analysis of the dynamics of possible future proliferation. The extent to which any of those projections are borne out by future events would depend heavily upon the success of policies for preventing proliferation.

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# TRENDS IN NUCLEAR PROLIFERATION, 1975-1995:

## Projections, Problems, and Policy Options

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Hudson's report analyzes the dimensions and problems of proliferation, focusing upon 1975-1995. Section I briefly categorizes the pressures for and the constraints upon a decision to acquire nuclear weapons by present and future candidate nuclear-weapon countries. Section II delineates the probable scope and analyzes the dynamics of future proliferation, developing a set of alternative proliferation projections. Section III provides a more detailed characterization of the parameters of Nth-country nuclear-weapon postures and programs, concluding with a discussion of Nth country strategic situations. Section IV identifies, categorizes, and evaluates the problems of a world of many more nuclear powers. Section V comprises an overview of possible American policy options for slowing the pace and managing the problems of proliferation. Building upon the earlier analysis, the purpose of this final section is to identify policy approaches warranting additional, more detailed study.

## Table of Contents

## List of Tables

## Executive Summary

Focusing upon 1975-1995, this report analyzes future trends in nuclear proliferation. In so doing, it categorizes pressures for and constraints upon proliferation; delineates the possible scope and analyzes the dynamics of proliferation, developing a set of 15 alternative proliferation projections; characterizes the parameters of Nth country nuclear-weapon programs and postures; examines the problems of a proliferated world; and identifies critical policy approaches warranting more detailed study.

### I. The Decision to Develop Nuclear Weapons: Pressures and Constraints

Section I briefly categorizes the most important pressures for and constraints upon future proliferation. Because the scope and dynamics of proliferation will be determined by the interaction between those pressures and constraints, this section provides a necessary foundation for the more detailed projections of Section II.

In examining what might lead a country to develop nuclear weapons, underlying pressures or reasons should be distinguished from triggers of the actual decision. Moreover, given an occasional tendency by some to jump from the existence of reasons for developing nuclear weapons to predictions of explosive proliferation, the existence of constraints needs to be emphasized. Nonetheless, the following, singly or collectively, could erode several of the more important constraints: the continued growth of nominally-safeguarded nuclear-exports deals; the possible near-term emergence of a nuclear-exports "grey market," encompassing the ready availability of "scientific mercenaries" and perhaps eventually the sale of nuclear weapons or the "blueprints" and special nuclear materials for their construction; and the increasing availability to potential Nth countries of new uranium enrichment technologies.

The following table summarizes potential reasons, most critical constraints, and possible triggering events for critical potential Nth countries:

Critical Potential Nth Countries:* Possible Reasons, Constraints, and Triggering Events

| Country | Potential Underlying Pressures or Reasons** | Most Critical Constraints | Possible Triggering Events | NPT Party |
|---|---|---|---|---|
| Argentina | Quest for regional status and influence; strengthen domestic morale; pressures from military | Risk of unauthorized seizure; reaction of regional opponents | Foreign crisis; domestic crisis; nuclearization of other countries | No |
| Brazil | Quest for regional and global status and influence; pressures from military | Risk of unauthorized seizure; dependence on foreign nuclear inputs | Nuclearization of other countries; changed perceptions of nuclear weapons' utility (as source of status and influence) | No |
| India | Deterrence of nuclear rival; buttress to bargaining position; quest for status and influence; strengthen domestic morale; scientific momentum | Reaction of other countries; dependence on foreign nuclear inputs | Nuclearization of other countries; domestic or foreign crisis; weakening of international constraints | No |
| Iran | Deterrence of nuclear rival; defense against invasion; buttress to bargaining position; quest for regional and global status and influence | Dependence on foreign nuclear inputs; reaction of allies and opponents | Nuclearization of other countries; weakening or breakdown of international constraints; foreign crisis | Yes |
| Israel | Deterrence of nuclear rival; defense against invasion; buttress to bargaining position; weapon of last resort | Reaction of regional opponents, allies, and other nations | Reduction of alliance credibility; nuclearization of other countries; foreign crisis | No |
| Japan | Deterrence of a nuclear rival; buttress to bargaining position; quest for global status and influence | Domestic public opposition; problems developing credible nuclear strategy; dependence on foreign inputs; reaction of other countries | Reduction of alliance credibility; domestic political change; foreign crisis; nuclearization of other countries | No |
| Libya | Buttress to bargaining position; nuclear intimidation of non-nuclear rivals; quest for regional status and influence | Limited technological and industrial base; reaction of opponents | Increased availability of necessary inputs | Yes |
| Pakistan | Deterrence of nuclear rival; defense against invasion; buttress to bargaining position; strengthen domestic morale | Cost; limited technological and industrial base; reaction of regional opponent | Nuclearization of other countries; foreign crisis; increased availability of necessary resources | No |
| South Korea | Defense against invasion; deterrence of nuclear rival; intimidate non-nuclear rival | Reaction of allies and regional opponents; dependence on foreign nuclear inputs | Reduction of alliance credibility; weakening or breakdown of international constraints | Yes |
| Taiwan | Defense against invasion; buttress to bargaining position; demonstrate national viability; strengthen domestic morale | Dependence on foreign nuclear inputs; reaction of allies and other countries | Reduction of alliance credibility | Yes |
| West Germany | Deterrence of nuclear rival; buttress to bargaining position | Reaction of opponents and of allies; domestic opposition | Reduction of alliance credibility; weakening or breakdown of international constraints; foreign crisis; nuclearization of other countries | Yes |

*Based upon analysis of proliferation projections in Section II of the report.

**For certain countries the overt emergence of particular pressures or reasons would depend upon international and domestic changes such as are discussed in Section II. Thus, some potential pressures or reasons may well remain latent until, if ever, these changes occur.

## II. Alternative Projections of the Scope and Dynamics of Future Proliferation

To delineate the possible scope and analyze the dynamics of proliferation from 1975 to 1995 this section of the report develops 15 alternative projections of future proliferation.* In contrast to the more usual country-by-country analyses, thinking in terms of such alternative projections, comprised of sets of proliferation chains, highlights the linkages among future proliferation events and decisions, points to time-relationships among individual decisions to "go nuclear," and helps to identify proliferation turning-points. More specifically, in chart form, each projection identifies future Nth countries, notes the type of program begun and its approximate timing, points to linkages among Nth country decisions to "go nuclear," and categorizes the strength and type of linkages within specific proliferation chains. In explaining the projections, differing assumptions are employed about: (1) the strength of and balance among various pressures; (2) the influence of different constraints; (3) ways in which the constraints might erode and the pressures be intensified; (4) the presence and impact of proliferation turning-points; (5) the degree of proliferation momentum; and (6) the existence and effects of fortuitous domestic occurrences.

These projections are not predictions. However, taken as a whole, in comparison with each other, they facilitate analysis of the potential scope of future proliferation; its approximate timing; and, most importantly, the critical dynamics and sequences involved. The extent to which any of them are borne out by future events would be influenced heavily by the success or failure of anti-proliferation policies.

### Alternative Projections

Projection 1 - "Limited but Steady Proliferation to 1995" - depicts the possible lower boundary of proliferation. Approximately every five years several additional countries "go nuclear." Iran links together partial proliferation in Asia and nuclearization of the Middle East. But, for most potential Nth countries, including Japan and West Germany, the balance of pressures and constraints still produces decisions not to develop nuclear weapons.

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*For illustration, one of these projections is included here (p.ix).

## Projection 1

## Limited but Steady Proliferation to 1995

Projection 1A - "Proliferation Phase II Is Kept From Taking Off" - posits a multifaceted reinforcement of international pressures against proliferation. It also continues to assume that those proliferation-limiting factors operable in Projection 1 remain in effect. The scope and pace of future proliferation are significantly reduced. But, by the mid-1990s the impact of these reinforced external constraints begins to erode, leading to a reanimation of proliferation.

Projection 1B - "Suppressed Proliferation Following Use of Nuclear Weapons" - envisages an initial late 1970s-early 1980s partial spurt of proliferation in Asia, followed by superpower actions--triggered by the shock of the first use of nuclear weapons since Nagasaki--to suppress any additional proliferation. It also takes account of likely proliferation-dampening effects if such first use were unsuccessful or involved a nuclear-weapon accident or unauthorized use in an internal revolt or civil war. Conversely, this projection notes the probable proliferation-stimulating effect--increasing the perceived utility of nuclear weapons--of successful use.

Projection 2 - "Early to Mid-1980's Latin American Proliferation" - depicts slightly more rapid and extensive proliferation in that region. Given its perceptions of Brazil's intentions, Argentina jumps the gun on Brazil with both emerging as nuclear-weapon countries by 1990. Fearful of international sanctions, however, Brazil uses the guise of a PNE program. Brazil's actions, in turn, increase pressures upon Iran--also an aspirant to eventual great-power status. Therefore, the global effects of Latin American proliferation are somewhat less limited than in Projection 1. But partly because West Germany responds strongly to Brazilian attempts to circumvent safeguards agreements, a rush to "go nuclear"--fueled by both a belief that widespread proliferation was becoming inevitable and by a reduced fear of sanctions--does not occur.

Projection 3 - "Libyan-Triggered Early 1980's Middle East Proliferation" - depicts one way in which the earlier projection of limited but steady proliferation could begin to break down. Libyan acquisition of nuclear weapons, by purchase or theft, triggers nuclearization of the Middle East and the Persian Gulf. Moreover, proliferation momentum increases and pressures to "go nuclear" are reinforced in several additional countries. But in Europe such reinforced pressures, particularly within Italy, are absorbed by movement to create a European Nuclear Force (ENF).

Projection 3A - "Limited, Early to Mid-1980's Proliferation in Europe (no ENF)" - examines the possible consequences in Europe of such early Asian and Middle East proliferation without the preceding efforts to create an ENF. Even in the absence of such a force, those consequences

as yet appear relatively limited. Italy now "goes nuclear," as does Spain. But, more importantly, because there has been neither a marked increase in security or status-related pressures upon West Germany, nor a marked decrease in either its external or internal constraints, West Germany remains non-nuclear.

Projection 4 - "Early to Mid-1980's Emergence of a Nuclear-Exports "Grey Market" - depicts the far-reaching impact were the Libyan purchase of nuclear weapons to be part of a more general breakdown of supplier restraint and the emergence of a "grey market." The emergence of such a "grey market" in the early 1980s accelerates the pace of proliferation; increases its scope;and changes the characteristics of several Nth country nuclear-weapon programs. It does so by making necessary nuclear inputs increasingly available; sharply reducing Nth country fears of sanctions, should they violate or circumvent safeguards agreements; and building up proliferation momentum.

Projection 5 - "More Extensive Global Proliferation: Repercussions of Growing Perceptions of American Unreliability" - delineates the possible effects of a growing loss of confidence in American security guarantees on the part of Taiwan, South Korea, and then Israel. More extensive proliferation in Asia is followed by nuclearization of the Middle East. Both lead, in turn, to an acceleration of proliferation momentum, increasing its pace and scope in other regions. Japan and West Germany, nonetheless, remain non-nuclear. Each distinguishes itself from such other "less vital" American allies; while within Europe, movement to create an ENF contributes to containing West German anxieties.

Projection 6 - "Explosive Late 1980's-Early 1990's European Proliferation: A West German Nuclear-Weapon Program" - depicts one possible route to increasingly widespread proliferation and the complete breakdown of international constraints after the mid-1990s. Because efforts to create a European Nuclear Force prove abortive, a small group of well-placed officials--motivated by slowly increasing insecurity, but constrained by fear of external reactions and internal psychological and political factors--arranges for covert West German participation in and assistance to an emerging Brazilian or South African nuclear-weapon program. Continued intensification of security pressures leads eventually to an overt program. These West German actions greatly intensify proliferation momentum, leading, for example, to renewed debate about "going nuclear" even in Sweden and Switzerland. More importantly, they upset the balance of pressures and constraints in Japan, triggering a Japanese nuclear weapon program. The ultimate outcome, as the NPT is allowed to lapse and a "grey market" emerges, is a breakdown of international constraints after 1995.

Projection 7 - "Widespread Mid- to Late 1980s Proliferation in Asia: Japan 'Goes Nuclear'" - examines one possible route to a Japanese decision to develop nuclear weapons and its potential consequences. A combination of rising world involvement, failures of the benign disengagement posture, burgeoning nationalism, growing proliferation momentum, increased status-related pressures, and mounting insecurity leads to that decision. The emergence of a nuclear-armed Japan triggers additional proliferation in Asia, increases proliferation momentum, reinforces and legitimizes the belief that possession of nuclear weapons is a prerequisite to status and influence, erodes the NPT, and strengthens forces producing a nuclear-exports "grey market." Within Europe, however, stimulus to West German interest in nuclear weapons is absorbed within the emerging ENF.

Projection 7A - "Asian-Influenced, Late 1980's Middle East Proliferation" - depicts the likely impact within the Middle East of Japan's decision to "go nuclear"--if, in contrast to Projection 7, nuclearization of the Middle East had not as yet occurred. A combination of increased status-related pressures and decreased fear of international sanctions both resulting from Japan's decision tips the balance in favor of an Iranian nuclear-weapon program. In turn, Iran's decision to "go nuclear" triggers widespread Middle East proliferation.

Projection 7B - "Asian-Influenced, Late 1980's-Early 1990's Proliferation in Europe" - envisages widespread European proliferation triggered by Japan's emergence as a nuclear-weapon country. That event markedly reduces the internal constraints upon West Germany, while greatly increasing the pressures upon it to "go nuclear." Many persons begin to argue that fifty years after World War II West Germany should provide for its own defense. After a period of internal debate, and in the absence of an effective European Nuclear Force, West Germany begins to develop nuclear weapons. Spiralling proliferation momentum, and the fashionableness of "going nuclear," lead Italy, Spain, Sweden and Switzerland to follow suit. The NPT is allowed to lapse in 1995 and a nuclear-exports "grey market" emerges.

Projection 8 - "Late 1980's Erosion of Technological Constraints and of the NPT System" - delineates the potential effects of widespread availability of new enrichment technologies, growing tolerance of safeguards agreements violations, the ready availability of "scientific mercenaries," and mounting withdrawals from the NPT system. To an even greater degree than in Projection 4--"Early to Mid-1980's Emergence of a Nuclear-Exports "Grey Market"--the pace of proliferation is accelerated, its characteristics changed, and its scope expanded. Moreover, when decreased technological constraints and a reduced risk of retaliation are joined to reinforced proliferation momentum, a growing number of countries now "go nuclear" simply because it is becoming fashionable

and relatively "cost-free" to do so, e.g., Venezuela, Cuba, Indonesia, the Philippines, Zaire, and Nigeria. Nonetheless, West Germany and Japan remain non-nuclear.

Projection 9 - "Mid- to Late 1980's Proliferation in Eastern Europe" - envisages movement by first Yugoslavia and then Rumania to acquire nuclear weapons. It takes note, therefore, of a set of events that is often overlooked or dismissed out-of-hand.

Projection 10 - "Widespread, Multi-Regional, Chain Reaction Proliferation to 1995" - encompasses most of the trends and developments analyzed individually in the preceding projections. It highlights the driving forces of possible future proliferation:

(1) Continuing erosion and eventual breakdown of external constraints, typified by: spread of nominally-safeguarded export deals, frequently involving sensitive facilities; failure to inflict sanctions upon nations circumventing or abrogating safeguards agreements; emergence of nuclear-exports "grey market"; and either a lack of or unsuccessful efforts to inflict costs upon the first Nth countries.

(2) Weakening of internal constraints, most evidenced by the the gradual technological and industrial development of many potential Nth countries and by domestic political and psychological changes in critical countries such as Japan and West Germany.

(3) A steady intensification of security-related pressures, stemming from: growing perceptions of American unreliability; decisions by regional opponents to "go nuclear"; and specific regional security shocks, e.g., renewed conflict in Korea, South Asia, or the Middle East.

(4) Ever-growing importance of status and influence-related pressures as possession of nuclear weapons is perceived increasingly to be an unavoidable prerequisite of regional or international status and influence, a necessary accouterment of nationhood, and, put simply, "in fashion."

(5) Spiralling proliferation momentum, resulting from the growing belief that widespread proliferation is inevitable, which heightens the fashionableness of possessing nuclear weapons, reinforces other pressures, and intensifies the temptation to jump the gun on traditional opponents.

(6) Occurrence of proliferation turning-points, including: decisions to "go nuclear" by critical countries such as Japan and Iran, the emergence of a nuclear-exports "grey market," and successful Nth country use of nuclear weapons.

(7) Failure of renewed efforts, after the initial spurt of proliferation, to create a European Nuclear Force, which could absorb growing pressures upon West Germany to "go nuclear" and preclude the adverse impact of such a West German decision upon the scope and pace of proliferation.

(8) Presence of fortuitous, but compelling, domestic reasons for developing nuclear weapons, including efforts to: strengthen domestic morale, perhaps in Taiwan or Pakistan; reassert past glories, perhaps in a militarily-ruled Italy; and divert domestic attention from internal problems, perhaps in India or Indonesia.

(9) Poor policy and/or bad luck, particularly given the importance of anti-proliferation efforts in determining the extent to which any of the preceding projections would be borne out by future events.

## Critical Countries, Hostile Pairs, and Turning-Points

Drawing upon the proliferation projections, the report then distinguishes the most critical potential Nth countries in terms of their impact upon the scope and pace of possible future proliferation. To do so, it identifies (1) the total number of future proliferation decisions within all projections that each country directly influences; (2) the total number of proliferation decisions that might not occur without a given country's decision; (3) those countries whose decision not to "go nuclear" could reduce by at least 10 percent the scope of successive proliferation within each projection; and (4) a set of critical countries for each individual projection whose combined decisions not to "go nuclear" might reduce proliferation decisions by more than 75 percent, aborting the projection. Based upon that analysis, the following are the most critical of the 34 projected potential Nth countries:

| | | |
|---|---|---|
| Argentina | Israel | South Korea |
| Brazil | Japan | Taiwan |
| India | Libya | West Germany |
| Iran | Pakistan | |

Based upon the projections, the report next delineates hostile pairs of potential Nth countries and of Nth countries and other nuclear-weapon states. These are listed in the following table:

| Countries | Earliest Projected Possible Date of Both With Nuclear Weapons |
|---|---|
| Egypt-Israel | Early 1980s |
| Egypt-Libya | Early 1980s |
| India-Pakistan | Early 1980s |
| Israel-Libya | Early 1980s |
| Taiwan-CPR | Early 1980s |
| Argentina-Brazil | Mid-1980s |
| India-Iran | Mid-1980s |
| Iran-Iraq | Mid-1980s |
| Iran-Saudi Arabia | Mid-1980s |
| Iran-Soviet Union | Mid-1980s |
| Israel-Iraq | Mid-1980s |
| Yugoslavia-Soviet Union | Mid-1980s |
| Japan-CPR | Mid- to Late 1980s |
| Japan-Soviet Union | Mid- to Late 1980s |
| Iraq-Syria | Late 1980s |
| Israel-Syria | Late 1980s |
| South Korea-North Korea | Late 1980s |
| West Germany-Soviet Union | Late 1980s |
| Algeria-Libya | Early 1990s |
| Greece-Turkey | Early 1990s |
| Indonesia-Australia | Early 1990s |
| Philippines-Indonesia | Early 1990s |
| Turkey-Soviet Union | Early 1990s |
| South Africa-Zaire | Mid-1990s |
| South Africa-Nigeria | Mid-1990s |

To conclude Section II, 9 proliferation turning-points, similarly derived, are identified:

1. Proliferation decisions by critical countries
2. Sale or gift of a nuclear weapon
3. Use of nuclear weapon(s)
4. First withdrawal from NPT
5. Emergence of a nuclear-exports "grey market"

6. Widespread dissemination of new enrichment technologies
7. Sharp reduction of American alliance credibility
8. Breakdown of NPT system
9. Unsuccessful or ineffective application of sanctions following safeguards-agreement violation

The purpose of the preceding analysis is not only to refine further understanding of the dynamics of proliferation but also to illustrate how thinking in terms of proliferation projections and sets of proliferation chains could help to indicate ways of dampening proliferation by severing key linkages and preventing the occurrence of proliferation turning-points.

## III. Parameters of Nth Country Nuclear-Weapon Programs and Postures

Working within the framework of the proliferation projections, Section III provides a more detailed characterization of the parameters of Nth country nuclear-weapon programs and postures. It concludes by delineating critical aspects of Nth country strategic situations. Depending upon those parameters and the resulting patterns of proliferation, the problems and risks of living in a world of many more nuclear-weapon states would vary significantly.

### Critical Technical Characteristics

Most, if not nearly all, future Nth countries should be able to test and begin to stockpile relatively well-packaged, fission weapons weighing approximately 1,000 pounds within a limited number of years. Such early-generation weapons might lack adequate safety-design features. Even with later-generation weapons, a nuclear-weapon accident could occur if insufficient resources had been devoted to its prevention.

Given both the projected timing of decisions to "go nuclear" and the greater difficulties of developing fusion than more advanced fission weapons, during 1975-1995 nearly all Nth countries are likely to be confined to developing and stockpiling fission weapons.

A varied range of delivery systems would be available to future Nth countries. Depending upon the specific country's level of technological and industrial sophistication, its access to foreign assistance, past

and future patterns of foreign military sales, and perceived military and political requirements, these might include: clandestine insertion, i.e., smuggling a weapon into an opponent's territory; civilian aircraft; nuclear-capable aircraft; a nuclear-armed torpedo; drone aircraft; unguided rockets; cruise missiles; naval attack missiles; short-range ballistic missiles; and IRMBs, SLBMs, and perhaps even ICBMs.

The purpose of "going nuclear," resource constraints, perceived threats, doctrine, and bureaucratic politics would interact in determining the size of Nth country nuclear forces. Many could settle for development of small forces, e.g., a stockpile of 50 to 75 20-50 kt. warheads and associated delivery vehicles.

To the leaders of the many politically unstable potential Nth countries, with long histories of military involvement in their domestic politics--including, for example, Argentina, Brazil, South Korea, Pakistan, Turkey, Libya, Egypt, and Iraq--controlling against unauthorized seizure or use of nuclear weapons could be more important than insuring that the nuclear force would be ready and able to go when needed. Even in those Nth countries with lesser risk of civil-military confrontation, strong pressures to protect against unauthorized or unintended use are likely to be present. But, in certain cases, either or both types of countries might not be able to follow this preference for tight control.

The limited intelligence/information gathering capability of many Nth countries could intensify some arms races, increase the likelihood of an accidental or unintended nuclear exchange between hostile Nth countries, and make it more difficult to pursue a controlled-response strategy.

Development of a highly reliable, redundant, and survivable command, control, and communication system may well exceed the resources of many Nth countries. Preemptive pressures and the risk of inadvertent war might increase significantly, therefore, during intense Nth country crises. To reduce the impact of $C^3$ failure--at the expense of increasing the risk of unauthorized use and inadvertent or accidental war--some Nth countries could well adopt a "fail-deadly" mode of operation.

Although often cited as a likely response to the problem of protection against surprise attack, launch-on-warning might appear too politically unreliable for some Nth countries and/or less reliable than available alternatives, including dispersal, mobility, and hardening, for others. Alternatively, the likelihood that some future Nth countries would pay little attention to the problem of protection, being satisfied with only the facade of a nuclear force or having a limited, and on occasion, non-existent, fear of being attacked should not be overlooked.

## Alternative Nth Country Nuclear-Weapon Doctrines and Postures

Within the limits set by the preceding technical characteristics, alternative Nth country doctrines and postures can be distinguished. These include the following ones.

Development of nuclear weapons need not be accompanied by a well thought out strategic doctrine and careful attention to developing a stable, reliable nuclear force. Rather, for some countries, e.g., Argentina, Brazil, Spain, Venezuela, Turkey, and Italy, possession of nuclear weapons might be regarded simply as a "general good thing," providing diffuse benefits.

Several critical Nth countries, e.g., Taiwan, Iran, Israel, South Korea, and Pakistan, are likely to be at least partly interested in the tactical battlefield use of nuclear weapons. To backstop the battlefield force, one of the minimum deterrence postures noted next probably would be adopted.

Deterrence by uncertainty, relying upon and manipulating the uncertainties inherent within a strategic confrontation, to deter either conventional or nuclear attack, is likely to be most appealing to, though not necessarily effective for, a small power confronting a large one, e.g., Iran vs. the Soviet Union, Yugoslavia vs. the Soviet Union, Pakistan vs. India, or Egypt vs. Israel. It could be the only alternative initially open to such weaker states.

Proportional deterrence contends that a small nuclear power, capable of reliably threatening a limited counter-city second-strike, could deter a larger nuclear power because the latter's costs of attacking would outweigh the benefits of taking over or destroying the former. Such a posture, an advance over deterrence by uncertainty because of its attempt to develop a reliable, stable, second-strike force, might be adopted by India vs. the CPR, Pakistan vs. India, and Japan vs. the Soviet Union--if it does not exceed their capabilities.

Some Nth countries are likely to seek, not necessarily successfully, nuclear superiority--defined simply as "more is better than less." Cases in point, again depending partly upon available resources and capabilities, could be Israel vs. the Arabs, India vs. Pakistan, Iran vs. Iraq, Brazil vs. Argentina, and perhaps eventually Japan vs. the CPR. Whether or not its pursuit was destabilizing is likely to vary with the specific strategic situation.

Assured Heavy Damage would be the Nth country version of Mutual Assured Destruction. It could arise in strategic situations in which two relatively comparable countries confronted each other, e.g., Iran vs. India, perhaps Argentina vs. Brazil, and eventually Egypt vs. Israel.

The possibility that many Nth country strategic situations of 1975-1995 could involve confrontations between small strategic forces with "limited" destructive potential could foster psychological readiness to adopt controlled-response doctrines, as opposed to counter-city strategies. But, the technical characteristics of some Nth country forces could hinder their implementation.

Among the determinants of doctrine and posture are: purpose(s) of "going nuclear"; economic, financial, and technical capabilities; doctrinal fashions and trends; interaction with major opponent(s); domestic institutional and political factors, including teaching within military institutions, bureaucratic politics, and electoral politics; and the pace of future proliferation.

No single course of doctrinal evolution, e.g., away from unsophisticated doctrine, can be posited. In addition to interaction among the preceding determinants, it is likely to be heavily influenced by critical events during the early stages of the next phase of proliferation, e.g., successful Nth country use of nuclear weapons.

## Nth Country Strategic Situations

Drawing upon the preceding examination of the parameters of Nth country nuclear-weapon postures and the proliferation projections, the report then characterizes three critical aspects of strategic interaction among or involving Nth countries. These are: varieties of arms racing; first-strike vulnerability of the opposed strategic forces; and types of superpower, medium nuclear power, and peripheral Nth country involvement in the core confrontation.

More often than not, proliferation would be accompanied, at least initially, by increased arms racing among pairs or sets of hostile Nth countries, e.g., within the Middle East, South Asia, and Latin America. However, particularly where resource availability is an important constraint, some arms races might begin, spurt, and then end with the weaker side accepting an inferior position. Finally, in certain situations, e.g., those in which a country has "gone nuclear" only because doing so is "in fashion," only limited arms racing, if any at all, is likely.

Many discussions of proliferation assume that reciprocal vulnerability to a first-strike would be the standard relationship between opposed Nth countries. But, depending upon the specific countries, the stage of their nuclear-weapon programs, and the various choices made, other outcomes also are likely to occur, including: reciprocal survivability; unilateral vulnerability; mutual relative survivability; and, least frequently, mutual invulnerability.

At least initially, most Nth country strategic situations are likely to be characterized by superpower involvement, of which various patterns and intensities can be distinguished. Initial involvement might either give way to efforts to decouple or lead to attempts to circumscribe the risks of reluctant entanglement. Most strategic situations are likely also to entail involvement by peripheral Nth countries and by medium nuclear powers. Differing intensities of such involvement are again likely to be evident. The presence or absence of such outsiders is likely to influence significantly the characteristics of the core confrontation.

## IV. Problems and Risks of Proliferation

Building upon the preceding, the report then identifies and briefly illustrates the problems and risks of proliferation, indicates approximately when a praticular problem could begin to emerge, assesses its likelihood, and evaluates its significance for the United States and the Soviet Union.

### Use of Nuclear Weapons

Various ways in which nuclear weapons might be used as early as the 1980s can be envisaged.* These include:

Use to support or defend against invasion, following escalation from a conventional conflict;

Inadvertent or unintended use, erupting out of an intense crisis and triggered by preemptive pressures and reciprocal fears of surprise attack;

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*See below, p. xxv-xxvi for an illustrative list of possible specific situations in which this problem and the ones discussed next could occur.

Calculated nuclear-first-strikes;

Preventive use to forestall a regional opponent from "going nuclear";

Anonymous use, whether by extremist political groups or radical governments; and

Catalytic use by one Nth country in an attempt to provoke a nuclear exchange between two other Nth countries during an intense crisis or limited conflict.

Depending upon the specific use of nuclear weapons and the size and characteristics of Nth country nuclear forces, the level of fatalities would vary. During the time period in question, 10 million deaths on each side may well be close to the upper boundary of small-power nuclear wars. Thus, Nth country nuclear-weapon use probably would result in a level of destruction significantly different from that of certain previous small-power wars, domestic upheavals and civil wars, and natural disasters. Development of fusion weapons by the mid- to late 1990s, of course, could result in one or two orders of magnitude change in expected fatalities.

The threat posed by even "limited" use of nuclear weapons is not to be minimized. As discussed below, in many possible conflicts the risk of widening involvement, eventually dragging the superpowers into a direct confrontation, is likely to be present. More importantly, even only a "limited" use of nuclear weapons might shatter, or at least gravely weaken, pre-existing psychological perspectives and norms, culminating in the erosion of the nuclear taboo and the conventionalization of nuclear weapons. That is, first Nth countries and then the superpowers could come to believe that nuclear weapons were simply more advanced conventional weapons, that they should be used whenever efficiency so dictated, that their purpose extended beyond deterring the use of other nuclear weapons, and that the risk of a nuclear war did not impose a special circumspection upon state behavior. Given the dangerousness of such conventionalization, the report examines this possible outcome in some detail.

## Increased Global Competitiveness and Nastiness

Proliferation is also likely to increase global competitiveness and nastiness. Critical aspects of such increase, more broadly typified by the following, could be evident by the early to mid-1980s:

Instances of nuclear blackmail, occasionally resulting in "local Munichs";

Increasingly widespread efforts by potential Nth countries to manipulate the threat to "go nuclear";

The exacerbation of some and the reinvigoration of other international disputes, only partly balanced by those cases in which acquisition of nuclear weapons helps to calm an existing dispute or leads ultimately to a mutually acceptable modus vivendi;

Cases of increased regional arms racing;

Pressures for increased superpower arms racing, especially if Nth country targeting of the Soviet Union revives Soviet interest in BMD;

A growing risk of superpower confrontations arising from Nth country disputes; and,

The increasing availability and dissemination of nuclear weapons to extremist groups, criminal organizations, and eventually even wealthy individuals.

In addition to its direct costs, such increased competitiveness and nastiness probably would decrease the likelihood that necessary new international institutions regulating trade, resources, global monetary affairs, energy, and the environment could be negotiated successfully. It also is likely to contribute to that corrosion of political authority discussed below.

## Intensification of Internal Political Conflict

Although much public and governmental debate has focused upon the risk of nuclear terrorism--noted within the report--little attention has been paid to other ways proliferation could intensify internal political conflict. But, many potential Nth countries, e.g., Argentina, Brazil, South Korea, Egypt, Turkey, Pakistan, Indonesia, Libya, Greece, Iraq, and Syria, are politically unstable, and often have long histories of military involvement, punctuated by periodic military coups d'etat, in their domestic politics. In such countries, a "nuclear coup d'etat," entailing unauthorized seizure of nuclear weapons as a valuable bargaining asset, could well occur. Not only might such a coup bring a

romantic, unstable leader into control of nuclear weapons, but the successful use or threatened use of nuclear weapons could erode the nuclear taboo. Nuclear civil wars and nuclear separatist struggles are also quite possible. Here, too, the most important broader impact could be erosion of the nuclear taboo.

## Corrosion of Political Authority and Legitimacy

From the American perspective, the corrosion of political authority and legitimacy should be regarded as one of the most important risks of proliferation. Up until recently, however, it has been frequently overlooked.

Increasing proliferation could well produce an authoritarian global political shift, including the erosion of liberal values within the Western democracies. By the 1980s, controlling against nuclear theft, nuclear terrorism, and anonymous use could require adoption of measures inconsistent with democratic values and procedural norms. Alternatively, assuming a world of as many as 40 nuclear-weapon states by the 1990s, such increased authoritarianism could be expected, stemming initially from efforts to restore a sense of security in an increasingly insecure and hostile world. Particularly within the United States, a siege mentality, not unlike that of the McCarthy era, could emerge.

Furthermore, if extensive proliferation accompanied by nuclear terrorism, nuclear blackmail, and anonymous use occurs, many governments are likely to find it increasingly difficult to provide for the common defense. Failure to do so could lead then to a loss of governmental authority and legitimacy. Because it might follow unsuccessful adoption of more authoritarian measures to manage the problems of proliferation, to posit such loss is not inconsistent with recognition of the prior problem of increased authoritarianism. Here, too, the problem is likely to be more pronounced in the industrialized democracies than in authoritarian and/or less developed countries.

## Economic Costs

Managing the problems of proliferation is likely to entail a variety of budgetary costs. Concurrently, learning to live with the threat of nuclear terrorism might have non-budgetary economic costs, e.g., if the fear of successful nuclear terrorism triggered a series of autonomous decisions by corporations and individual citizens leading to a dispersal of industry and population.

Bizarre Events

In 400 A.D., Arcadius destroyed the Temple of Apollo "to go down in history" as the man who had so done. Equally bizarre problems, unforeseeable and unbelievable in 1975, are likely to occur.

Pulling together this section of the report, the following tables provide respectively a projection of future proliferation risks and a list of problems posing a direct threat to the United States or to the Soviet Union.

## V. Critical Policy Approaches

Given the possibility of increasingly widespread proliferation by the late 1980s-early 1990s and the problems that such proliferation could involve, the report's final section identifies potential American policy approaches for slowing the pace and managing the problems of proliferation. A detailed analysis of those approaches, not undertaken here, would be useful both for normative purposes and to better understand the effects of alternative policies.

### Slowing the Pace of Proliferation

On the one hand, efforts to slow the pace of proliferation might attempt to reinforce the constraints upon potential Nth countries. The following possible approaches warrant careful analysis:

A nuclear-exports policy designed to prevent the emergence of a nuclear-exports "grey market" and the erosion of technological constraints;

American and international policies for deterring or responding to those proliferation turning-points that could occur within the next years;

An Inclusive Comprehensive Test Ban Treaty; and

Means of inflicting costs upon Nth countries.

Projection of the Problems and Risks of Future Proliferation

| Problem or Risk | Some Possible Situations or Cases | Earliest Projected Date Could Emerge |
|---|---|---|
| **A. Risk of Use of Nuclear Weapons** | | |
| Inadvertent or unintended nuclear war | Argentina-Brazil | Mid-1980s |
| | Pakistan-India | Early 1980s |
| | Israel-Egypt | Early 1980s |
| | Greece-Turkey | Early 1990s |
| Catalytic nuclear war | PLO-triggered Arab-Israel war | Early to Mid-1980s |
| | Libya or Iraq-triggered Egypt-Israel war | Early or Late 1980s |
| Anonymous nuclear attack | By Libya or Iraq against Israel | Early or Late 1980s |
| | By Libya or Saudi Arabia against U.S. | Early to Mid-1980s |
| | By Soviet Union against U.S. | After widespread proliferation |
| Terrorist use | Against Israel by PLO fringe | Mid-1980s |
| | Against Western democracies by "Baader-Meinhof" types | Early to Mid-1980s |
| Nuclear Blitzkriegs or defense against invasion | India-Pakistan | Early 1980s |
| | South Korea-North Korea | Mid-1980s |
| | Iran-Soviet Union | Early to Mid-1980s |
| | Taiwan-CPR | Early 1980s |
| Calculated nuclear first-strike | Israel against Egypt | Mid- to Late 1980s |
| | India against Pakistan | Early 1980s |
| | Soviet Union against Iran | Mid-1980s |
| Preventive nuclear war | CPR against Japan | Late 1980s |
| | Iran against Iraq | Late 1980s |
| | Turkey against Greece | Early 1990s |
| | Soviet Union against West Germany | Late 1980s |
| | South Africa against Zaire | Mid-1990s |
| | Soviet Union against Yugoslavia or Rumania | Mid-1980s |
| Conventionalization of nuclear weapons | Beginning with preceding small-country nuclear wars and with shifts of Nth country doctrine | Mid-1980s |
| **B. Increased Global Competitiveness and Nastiness** | | |
| Nuclear blackmail and "local Munichs" | Iran against Persian Gulf countries | Mid-1980s |
| | Libya against Israel | Early 1980s |
| | India against Pakistan | Early to Mid-1980s |
| | CPR against Taiwan | Early 1980s |
| Threats to "go nuclear" | Already made by: Pakistan South Korea, Turkey, and Israel | Mid-1970s |
| Exacerbation or reinvigoration of old disputes | Argentina-Brazil | Mid 1980s |
| | Arab-Israeli dispute | Early 1980s |
| | Libya-Egypt | Early 1980s |
| | Iraq-Iran | Mid- to Late 1980s |
| | Iran-Saudi Arabia | Mid-1980s |
| | India-Pakistan | Early 1980s |
| | Japan-CPR | Mid- to Late 1980s |
| | Japan-Philippines | Mid- to Late 1980s |
| | Indonesia-Philippines | Early 1990s |

| Problem or Risk | Some Possible Situations or Cases | Earliest Projected Date Could Emerge |
|---|---|---|
| Increased regional arms racing | Argentina-Brazil | Mid-1980s |
| | India-Pakistan | Early 1980s |
| | Israel-Arab states | Early 1980s |
| | Japan-CPR | Mid- to Late 1980s |
| | Japan-Soviet Union | Mid- to Late 1980s |
| | Turkey-Greece | Early 1990s |
| | Iran-Iraq | Mid- to Late 1980s |
| | Iran-Saudi Arabia | Mid- to Late 1980s |
| Increased superpower arms racing | ABM deployment perhaps triggered by Soviet sense of threat from Nth countries | Late 1980s |
| Superpower confrontations in Nth country disputes | Middle East | Early 1980s |
| | South Asia | Early 1980s |
| | Persian Gulf | Mid-1980s |
| Undisciplined dissemination of nuclear weapons | Possible sources: India; Libya; romantic LDC leader brought into control of nuclear weapons by coup d'etat | Early 1980s |
| C. Intensification of Internal Political Conflict | | |
| Nuclear terrorism | Middle East | Early to Mid-1980s |
| | Western democracies | Early to Mid-1980s |
| Nuclear Coups d'etat, nuclear civil wars, nuclear separatist struggles | Argentina, Brazil, South Korea, Egypt, Turkey, Pakistan, Indonesia, Libya, Greece, Iraq, Spain, Italy, and Yugoslavia | Early to Mid-1980s |
| D. Corrosion of Political Authority and Legitimacy | | |
| Authoritarian global political shift | Particularly within Western democracies if threatened by nuclear terrorism and other anonymous use and/or by increased nastiness of proliferated world | Early to Mid-1980s or Mid-1990s and beyond |
| Loss of governmental legitimacy | Within Western democracies and some LDCs | In conjunction with or following above authoritarian shift |
| E. Economic Costs | | |
| Budgetary costs of increased defense spending to manage problems of proliferation | United States and Soviet Union | Mid- to Late 1980s |
| Non-budgetary economic costs of adjusting to threat of nuclear terrorism | Particularly within free-market economies and Western democracies | Early to Mid-1980s |
| F. Bizarre Events* | | |

*As stated in the accompanying text, the occurence of such bizarre events is likely but cannot be specified in advance.

## Problems Posing a Direct Threat to the United States or the Soviet Union

| United States | Soviet Union |
|---|---|
| Few Nth country forces eventually targeted on United States | At least several Nth country forces targeted early on Soviet Union |
| Anonymous nuclear attack | |
| Terrorist use | |
| Conventionalization of nuclear weapons | Conventionalization of nuclear weapons |
| Increased superpower arms racing | Increased superpower arms racing |
| Superpower confrontations arising from Nth country disputes | Superpower confrontations arising from Nth country disputes |
| Undisciplined dissemination of nuclear weapons | |
| Authoritarian political shift | |
| Loss of governmental legitimacy | |
| Budgetary and non-budgetary economic costs | Budgetary costs |
| Bizarre events | Bizarre events |

On the other hand, the following measures designed to reduce the pressures to "go nuclear" require equal attention and analysis:

Policies to influence the perceived utility of nuclear weapons;

Substitutes, including alliances, for independent nuclear forces;

Provision of surrogate sources of status and influence; and

Policies to dampen proliferation momentum by severing critical linkages within specific proliferation chains.

## Managing the Problems of Proliferation

Notwithstanding such efforts, further proliferation could occur. It is equally necessary, therefore, to identify policy approaches designed to manage and hopefully reduce the problems of proliferation.

One line of thinking would focus upon efforts to influence the postures and policies of new nuclear-weapon states. It would entail analysis and assessment of:

The advantages, disadvantages, and feasibility of providing technical assistance to Nth country nuclear-weapon programs, e.g., on weapon-safety design;

Measures to shape perceptions of nuclear weapons' utility and usability;

How to respond to an Nth country use of nuclear weapons in order to minimize the physical, political, and psychological damage; and

Desirable customs and norms for a nuclear world, as well as ways to foster them.

A second line of thinking would concentrate upon identifying and evaluating possible measures designed to contribute to regional stability, including:

Potential regional arms-control arrangements;

Regional institutional arrangements within which to absorb independent nuclear forces;

The provision of strategic intelligence to all sides about the capabilities and intentions of regional opponents;

Supplying short-term tactical intelligence and warning to opposed Nth countries; and

Means of institutionalizing credible security guarantees to the weaker nuclear and remaining non-nuclear countries within a given region.

A third line of thinking would analyze and evaluate possible policies for circumscribing the global repercussions of local proliferation. It might concentrate upon:

Alternative superpower rules of engagement in local disputes;

Methods of identifying anonymous attackers and of allowing non-perpetrators of an anonymous attack to establish their innocence;

Ways to foster or reinforce superpower understanding and acceptance of those norms, customs, and arms-control measures likely to be necessary for living in a proliferated world;

Policy options for dissuading or responding to the undisciplined dissemination of nuclear weapons;

How to foster international agreement on the principle of no-safe-haven for terrorists; and

Possible damage-limiting systems.

*  *  *  *  *

## Introduction

India's detonation of a nuclear explosive device has stimulated renewed concern about the possible future spread of nuclear weapons. Such concern that a second phase of proliferation was about to begin has arisen before, e.g., most recently in 1964, following China's testing of a nuclear weapon. Some persons might argue, therefore, that current attention represents an exaggerated reaction to the Indian test. To the contrary, there are strong reasons for concluding that this time the renewed concern is likely to be at least partly borne out by ensuing events.

Hudson's report analyzes the dimensions and problems of this second phase of proliferation, focusing upon 1975-1995. Section I briefly categorizes the pressures for and the constraints upon a decision to acquire nuclear weapons by present and future candidate nuclear-weapon countries. Section II delineates the probable scope and analyzes the dynamics of future proliferation, developing a set of alternative proliferation projections. Section III provides a more detailed characterization of the parameters of Nth country nuclear-weapon postures and programs, concluding with a discussion of Nth country strategic situations. Section IV identifies, categorizes, and evaluates the problems of a world of many more nuclear powers. Section V comprises an overview of possible American policy options for slowing the pace and managing the problems of proliferation. Building upon the earlier analysis, the purpose of this final section is to identify policy approaches warranting additional, more detailed study.

## I. The Decision to Develop Nuclear Weapons: Pressures and Constraints

This section briefly categorizes the most important pressures for and constraints upon future proliferation. Because the scope and dynamics of the second phase of proliferation will be determined by the changing interaction of those pressures and constraints, the following serves as an introduction to and foundation for the more detailed projections of Section II.

### Pressures for Proliferation

In examining the pressures and reasons that might lead a given country to decide to develop a nuclear-weapon capability, underlying

TABLE 1

Pressures or Reasons for Proliferation

Security

1. Deterrence of a nuclear rival
2. Defense against invasion
3. Weapon of last resort
4. Nuclear intimidation of non-nuclear rival(s)
5. Buttress to bargaining position

Status or Influence

6. Quest for regional or international status or influence
7. Demonstrate national viability
8. Fashion

Bureaucratic Factors

9. Strengthen military, scientific, and/or bureaucratic morale
10. Scientific-technological momentum
11. Pressures from military-industrial complex
12. Bureaucratic politics within governments and/or armed services

Domestic Politics

13. Strengthen domestic morale
14. Divert domestic attention

Pressures behind such a decision should be distinguished from triggers of the actual decision. Table 1 lists the most important pressures or reasons. Each is discussed in turn.

## Underlying Pressures or Reasons for Proliferation*

First, the belief that acquisition of even a rudimentary nuclear-weapon capability would allow a country to deter a nuclear rival has been and will continue to be an important security-related reason for "going nuclear." Thus, at least some French policymakers and strategists regarded an independent French nuclear force primarily as a contributor to deterrence of the Soviet Union. In turn, India's nuclear program appears to have been influenced first by China's detonation of a nuclear weapon in 1964 and then by its orbiting of an earth satellite in 1970.

Second, for certain potential Nth countries possession of nuclear weapons is likely to be seen as a necessary defense against invasion. Both the Swedish and Swiss nuclear-weapon debates of the late-1950s revolved heavily around the question of whether acquisition of a battle-field nuclear-weapon capability would buttress their security and their posture of armed neutrality. This pressure could be an important element within the security calculus of such countries as Taiwan, Pakistan, Israel--and perhaps once again even Sweden and Switzerland.

Third, for some countries acquisition of a weapon of last resort could be a reason for "going nuclear." Although most references to this pressure refer to Israel, it could be an important motivation for a Pakistani weapon-program or even for an eventual Iranian-triggered Saudi Arabian program.

Four, possession of a nuclear-weapon capability might allow a country to intimidate a non-nuclear rival, particularly if that rival lacked protection from a third party's nuclear umbrella. China's nuclear-weapon capability has had this effect upon India; an Iranian capability could have a comparable effect among Persian Gulf countries.

Five, the desire to buttress one's bargaining position and resolve could be a reason for "going nuclear." The objective might be to gain greater influence within an existing alliance, e.g., development of the French force de frappe was partly motivated by the belief that possession of nuclear weapons would lead to increased French influence within

*Table 5 at the end of this section notes the importance of specific pressures or reasons for those individual potential Nth countries that appear in the projections of Section III.

NATO and over American strategic policy. More usually, however, the aim is likely to be a strengthened position vis-a-vis a nuclear or potentially nuclear rival. This could be an important pressure for an Indian nuclear-weapon program, aimed at strengthening India's resolve in a confrontation with China.

Sixth, although virtually all decisions to develop nuclear weapons are likely to be publicly justified by reference to one or more security-related arguments, it is important to delve below that public rationale to determine what other pressures or reasons are likely to be present. Thus, the perceived benefits in terms of increased regional and international status and influence are also likely to be a compelling pressure motivating many future Nth countries. Countries such as Brazil, Iran, India, and perhaps even Japan could come to perceive nuclear weapons as a necessary ticket to "high table" negotiations--the Chinese bomb had such an effect, helping to confer, perhaps falsely, great power status to China. In addition, for some Nth countries, e.g., Iran and Brazil, possession of nuclear weapons is likely to be regarded as a necessary buttress to, if not a symbolic legitimation of, their claims to regional paramountcy.

Seventh, by detonating a nuclear weapon, a country might hope to demonstrate its national viability. For example, Taiwan, increasingly in need of international recognition of its viability, independence, and power, could attempt to gain that recognition by launching an overt nuclear-weapon program.

Eighth, if an increasing number of countries began to develop nuclear weapons, proliferation might develop a self-reinforcing momentum. Given such growing proliferation momentum, pressures upon some countries, e.g., Spain, to "go nuclear" because doing so was now in fashion would be intensified.

Finally, in considering the extent to which a quest for status and prestige could influence future decisions to "go nuclear," it is important to ask: "Prestige in whose eyes?". After the Indian explosion, simple possession of a rudimentary nuclear-weapon capability might not significantly enhance the prestige of aspirant great powers in the eyes of existing great powers. To the contrary, as in India's case, the latter's reaction could be a negative one, condemning the Nth country's misplaced priorities. But in the eyes of less developed countries and of regional neighbors, the result might be the opposite: the perception of technological triumph could outweigh any sense of misplaced priorities, and the symbolic impact of having "gone nuclear" could overwhelm whatever questions about the military usefulness that might arise.

Ninth, the decision to acquire nuclear weapons might be motivated by the elite's efforts to strengthen military, scientific, and/or bureaucratic morale. Thus, one objective of the Gaullist emphasis on the force de frappe appears to have been to restore military morale and provide a divided and defeated army with a new mission. Or, by "going nuclear" a country's leadership might hope to instill a "can-do" mentality within its scientific community and among its bureaucratic cadres. This factor could be increasingly evident in the decisions of the many, less developed potential Nth countries, e.g., India, Iran, and Egypt.

Tenth, scientific and technological momentum might also constitute a pressure for developing nuclear weapons. On the one hand, having begun to acquire a nuclear-weapon option, a potential Nth country could find that day-to-day scientific activity was continually refining that option and shortening the time needed to build up a stockpile of nuclear weapons once a decision to do so was made. On the other hand, organized scientific groups, or even well-placed individual scientists, could exert powerful pressures towards development of nuclear weapons, particularly in countries with weak political leadership and weak political institutions. Thus, in both Fourth Republic France and India, individual scientists played a critical role in initiating and moving along the early development of each country's respective nuclear-explosive programs.

Eleventh, pressures from organized economic groups, which would profit from a nuclear-weapon program, might be able to tip the balance in favor of acquiring nuclear weapons. Past experience in the industrialized countries indicates that these economic groupings and their military allies can achieve sufficient organizational momentum, political/economic influence, social prestige, and forensic ability in arguing strategic questions to influence the character, scope, and pace of military policy and weapon development.

Twelfth, even though the preceding categorizations implicitly assume that "going nuclear" would be the result of a "rational" policy choice, the possibility that such a decision might be the outcome of "bureaucratic politics" should not be overlooked. For instance, in the French case, existence of a nuclear-weapon program partly served to rationalize other policies within de Gaulle's foreign policy of grandeur and to counter domestic opponents of that foreign policy. Therefore, a country might decide to acquire nuclear weapons even though doing so would ultimately prove to be militarily counterproductive or inconsequential, economically unsound, or, more generally, not worth the costs.

Thirteenth, the decision to acquire nuclear weapons could be motivated by the elite's efforts to strengthen domestic morale. For example,

the timing of some of China's nuclear explosions appears to have been chosen partly to influence domestic morale by demonstrating China's military power and technological capabilities.

Fourteenth, diversion of domestic attention from domestic problems could be another reason for "going nuclear." Military power and geographical expansion are among the classic responses of elites to domestic political, social, or economic decay. Following late 1970s domestic unrest, a possible eventual Indian decision to launch a major nuclear-weapon program could be partly undertaken with this purpose in mind.

Before turning to a discussion of triggering events, one general point about the preceding reasons for "going nuclear" is in order. In each case, the perspective is that of the potential Nth country. Therefore, although to an outside observer a given reason might appear to be erroneous, e.g., the belief that even a rudimentary capability would allow for deterrence of a nuclear rival, the calculus of the particular country would not be changed.

## Triggering Events

The decision to develop a nuclear-weapon capability could be triggered by a variety of events. Table 2 lists and discusses the most important types of potential triggering events. It is not intended as an exhaustive enumeration.*

First, involvement in a foreign crisis might precipitate a decision to "go nuclear." Such a crisis could demonstrate the hostile intentions and possible readiness to use force of a regional opponent, create a need for restored international status and prestige, weaken public and military morale, call into question the credibility of alliance guarantees, and provide an opportune time for changing old policies and creating a consensus behind new initiatives.

Second, reduction of alliance credibility could also be a triggering event. For instance, it is often argued that the credibility of the American nuclear umbrella for Japan has been reduced by American force reductions in Asia, failure in Indochina, and by the emergence of a nuclear China. Political changes can also reduce alliance credibility. Thus, closing of the American embassy on Taiwan--even without termination

*See also Table 5.

TABLE 2

Types of Triggering Events

1. Involvement in foreign crisis
2. Reduction of alliance credibility
3. Nuclearization of other countries
4. Weakening or breakdown of international constraints
5. Domestic crisis
6. Government or leadership change
7. Increased availability of necessary resources and inputs
8. Changed perception of nuclear weapons' utility

of the Mutual Defense Treaty--would probably be seen by Taiwan as a symbol of sharply reduced American reliability.

Third, the nuclearization of other countries, both opponents and non-opponents, is likely to be an especially important triggering event. Acquisition of nuclear weapons by an opponent may well confront a country with the question of whether to accept a potentially threatening shift in the military and political balance or to follow suit. Alternatively, a given country's decision to "go nuclear" could trigger similar action by non-opponents by increasing the status associated with possession of nuclear weapons, easing the psychological and political problems of justifying acquisition, and/or otherwise demonstrating the potential benefits and limited costs of doing so. Moreover, in certain situations the belief--whether erroneous or not--that another country intended to develop nuclear weapons, might be preparing covertly to do so, or that it might eventually decide to do so, could suffice to trigger a matching response.

Fourth, a weakening or breakdown of international constraints upon nuclear proliferation could also trigger a decision to develop nuclear weapons. Particularly for those threshold countries that are heavily dependent upon external technological, military, political, and economic support, such a weakening or breakdown could alter significantly their evaluation of the costs and gains of a nuclear-weapon program. In that regard, as argued below, a breakdown of NPT controls upon the diffusion of nuclear technology and the emergence of undisciplined dissemination of nuclear exports could be especially threatening.

Fifth, a domestic crisis might trigger a decision to acquire nuclear weapons. The leadership's purpose could be to restore shaken morale by a technological tour de force. Or, if the domestic crisis involved a loss of governmental legitimacy, the leadership might seek to divert domestic attention by launching a nuclear-weapon program. With hostile foreign reaction, such a leadership, e.g., in India, might even hope to emerge more powerful than before as the defender of nationalist virtue.

Sixth, various types of domestic political changes might precipitate a decision to "go nuclear." The most obvious case would be replacement of a leadership opposed to nuclear weapons with one previously supporting their acquisition. In some situations, however, the opposite might hold. Thus, in Japan it is probably the case that only those political elites, e.g., the socialist or Komeito parties, that have consistently opposed nuclear weapons could institute a nuclear-weapon program. Alternatively, the rise to power of only one or a few individuals could in some instances be a triggering event. Thus, even though it appears likely that the Fourth Republic's nuclear-weapon program--itself

animated by a coterie of key individuals--would have eventually led to detonation of a nuclear weapon, that outcome was assured once de Gaulle returned to power.

Seventh, increased availability of necessary inputs could trigger a nuclear-weapon program. This could involve increased readiness on the part of other countries to transfer or sell sensitive technologies and materials, e.g., during the early to mid-1950s the Soviets provided China with substantial assistance towards a nuclear-weapon program. Similarly, technological breakthroughs, and their widespread diffusion, might remove technical or budgetary obstacles to nuclear proliferation. Both of these aspects are discussed more fully below.

Finally, a shift in the perceived utility of nuclear weapons might trigger a decision to "go nuclear." Notwithstanding the previously discussed reasons or pressures, lingering doubts about the balance of costs and gains of acquiring nuclear weapons are likely to be present in many candidate nuclear-weapon countries. The experience of the superpowers, bearing witness to the difficulties of turning the gross power provided by their nuclear arsenals into political gains, as well as to the problems associated with possession of nuclear weapons, has not been unnoticed. Nor has the "nuclear taboo" failed to have its impact among potential Nth countries. But, were the perceived utility of these weapons to shift markedly upward, e.g., following successful use of nuclear weapons by an Nth country or because of movement by the superpowers towards greater emphasis upon nuclear weapons, the terms of the debate in potential Nth countries could also change.

As suggested earlier, the preceding has not been intended as an exhaustive discussion of potential triggering events. Instead, its purpose has been to indicate the most likely precipitants to future decisions to develop a nuclear-weapon capability, assuming the existence of the more basic reasons for doing so and depending upon the constraints against such a decision.

## Constraints Upon Proliferation

The scope and dynamics of future nuclear proliferation will be determined not only by the preceding pressures, but also by the strength of various constraints. Given an occasional tendency on the part of some observers to jump from the existence of possible reasons for developing nuclear weapons to the spread of civilian nuclear power programs to predictions of explosive proliferation, it remains necessary, if seemingly pedantic, to emphasize the existence of such constraints.

However, it is also important to take account of possible future technologies, political and economic trends, and developments which could erode several of those constraints. Table 3 enumerates both sets of factors.*

## Constraints Upon Proliferation

First, depending upon the particular country and the type of program it was pursuing, cost could have an important constraining effect. Adjusting for inflation, the estimates provided within the U.N. Secretary General's 1967 report on proliferation, the ten-year cost of a small, unsophisticated force would be approximately $2.3 billion and that of a small, high-quality force would be approximately $7.4 billion.** Alternatively, it has been estimated that France will have spend $24.5 billion between 1955 and the end of 1975 on its nuclear-weapon program.*** By way of comparison, Table 4 lists expenditures for national defense both for the existing nuclear-weapon states and for those potential Nth powers within Section II's projections. When assessing the potential impact of such costs, it is important to consider not only the absolute level of resources involved, but also the opportunity costs and difficulties of reallocating economic resources to a nuclear-weapon program. That is, developing nuclear weapons involves a diversion of resourses from the civilian sector and is also likely to require diverting resources from alternative military uses. Complex trade-offs are, therefore, at issue. Moreover, in less developed potential Nth countries, existing military expenditures tend to be concentrated upon manpower, military vehicles, and arms and ammunition. Given that fact, the opportunity costs of "going nuclear" would be relatively greater because scarce technical and industrial resources, not usually allocated to defense, would have to be withdrawn from the civilian sector.

Second, although the spread of civilian nuclear power has increasingly provided many potential Nth countries with a basic knowledge of

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*See also Table 5.

**Effects of the Possible Use of Nuclear Weapons and the Security and Economic Implications for States of the Acquisition and Further Development of These Weapons (U.N. Doc. A/6858, New York, 1968).

***Ian Smart, Future Conditional: The Prospect for Anglo-French Nuclear Co-operation Adelphi Papers Number Seventy-eight (London: IISS, 1971), pp. 17-19.

TABLE 3

## Constraints Upon Proliferation

A. Constraints

1. Cost
2. Limited technological and industrial base
3. Dependence upon foreign nuclear inputs
4. Domestic public opposition
5. Risk of unauthorized seizure of nuclear weapons
6. Reaction of regional opponents
7. Reaction of allies
8. Reaction of other nations
9. Problems of developing a credible nuclear strategy

B. Possible Factors Likely to Erode Some of Preceding Constraints

1. Continued spread of nominally-safeguarded bilateral and multi-lateral nuclear exports deals
2. Emergence of nuclear exports "grey market" and possible breakdown of NPT system
3. Extraction of uranium oxide from seawater
4. Diffusion of uranium enrichment technologies

TABLE 4

Expenditures for National Defense, 1974*

| | Cost in billions (1974 dollars) | Percent of GNP |
|---|---|---|
| **A. Nuclear-Weapon States and India** | | |
| France | $ 8 | 2.9% |
| India | 2.4 | 3.1 |
| People's Republic of China | 5-10 (?) | 5-8.0 (?) |
| United Kingdom | 8.7 | 4.9 |
| U.S.S.R. | 96 | 10.6** |
| United States | 86 | 6.6 |
| **B. Non-Nuclear-Weapon States** | | |
| 1. High-Technology | | |
| Italy | 3.7 | 2.7 |
| Japan | 3.8 | 0.8 |
| Spain | 1.1 | 1.9 |
| Sweden | 1.6 | 3.0 |
| Switzerland | 0.9 | 1.9 |
| West Germany | 11.7 | 2.8 |
| 2. Medium-Technology | | |
| Argentina | 1.3 | 1.8 |
| Australia | 1.9 | 3.3 |
| Brazil | 1.2 | 1.9 |
| Chile | 0.2 | 1.2 |
| Greece | 0.6 | 3.6 |
| Iran | 3.2 | 14.0 |
| Israel | 3.7 | 42.0 |
| Pakistan | 0.6 | 6.7 |
| Rumania | 0.6 | 1.8 |
| South Africa | 0.8 | 2.8 |
| South Korea | 0.6 | 4.4 |
| Taiwan | 0.8 | 8.2 |
| Turkey | 1.0 | 4.6 |
| Venezuela | 0.3 | 2.0 |
| Yugoslavia | 1.3 | 7.0 |
| 3. Low-Technology | | |
| Algeria | 0.4 | 4.8 |
| Cuba | 0.3 | 6.4 |
| Egypt | 3.1 | 37.0 |
| Indonesia | 0.5 | 3.2 |
| Iraq | 0.8 | 16.0 |
| Libya | 0.4 | 7.8 |
| Nigeria | 0.5 | 7.3 |
| North Korea | 0.8 | 22.8 |
| Philippines | 0.1 | 1.3 |
| Saudi Arabia | 1.8 | 27.0 |
| Syria | 0.5 | 18.1 |
| Zaire | 0.1 | 3.3 |

*Derived from The Military Balance 1974-1975 (London: IISS, 1974).

**Estimates of Soviet defense expenditures and GNP are complex and controversial. This IISS estimate values Soviet defense expenditures and GNP at U.S. dollar prices.

and experience in nuclear research and management, many, nonetheless, have only a limited technological and industrial base from which to draw skilled personnel and resources for a nuclear-weapon program. Moreover, many of these countries also lack experience in setting-up and carrying-out a major weapon-development program, such as acquisition of nuclear weapons would entail. In point of fact, those less developed countries, e.g., Argentina and India, that have attempted to produce domestically sophisticated military equipment such as aircraft have encountered repeated difficulties.*

Third, until the late 1980s-early 1990s, many, if not most, of the current candidate nuclear-weapon countries will continue to be dependent upon foreign inputs for their civilian nuclear programs and industry, including fuel, reactors, and/or nuclear technology. For these countries, lacking an indigenous nuclear-weapon mobilization base, their overt nuclear-weapon option entails abrogating or circumventing safeguards agreements, throwing out the inspectors, and diverting material from the civilian nuclear fuel cycle. Depending upon the country in question, moreover, the costs of doing so could be high. In addition to those discussed next, these could include the loss of fuel supplies, nuclear technology, and related exports necessary for continued operation and growth of its civilian nuclear power industry--which may be producing or planned to produce a significant and expanding proportion of that country's energy output.

Fourth, domestic public opposition could be a powerful constraining force in some countries. For instance, a decision by either Sweden or Japan to "go nuclear" would be likely to trigger an intense hostile public reaction. However, in other countries, e.g., India or Iran, it is less likely that such public opposition would either emerge or, having done so, be able to hamper greatly a nuclear-weapon program.

Fifth, many potential Nth countries, including Argentina, Brazil, South Korea, Egypt, Turkey, Pakistan, Indonesia, and Libya, have been and are likely to continue to be characterized by continuing military involvement in their domestic politics, punctuated by periodic military coups. For the leaders of these countries, the risk of unauthorized seizure of nuclear weapons by dissident military personnel could be a reason for not "going nuclear."

Sixth, the possible reactions of regional opponents also have to be taken into account in deciding whether or not to develop nuclear weapons.

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*SIPRI, The Arms Trade with the Third World (Stockholm: Almqvist and Wiksell, 1971), pp. 744-753, 759-767.

A potential Nth country might fear any of the following: a preemptive military attack, against itself or only against its nuclear facilities, perhaps using conventional weapons; the loss of important economic benefits, including opportunities for trade and investment and access to scarce raw materials; the beginning of a regional nuclear arms race; or simply a general worsening of relations and heightening of tensions.

Seventh, possible hostile responses by allies might also be triggered by a decision to develop nuclear weapons. These might range from the loss of important military, technological, economic, and diplomatic support to an attempt by that ally to decouple itself from any commitment to the Nth country's defense.

Eighth, the fear of hostile reactions by other nations could also constrain a decision to "go nuclear." Although the likelihood of military action would probably be low, a range of negative economic, and/or political responses might be feared: trade relations and access to raw materials could be jeopardized; markets closed; aid reduced or terminated; and political and diplomatic support withdrawn.

Ninth, the problems of developing a credible nuclear strategy for some Nth country nuclear forces might also be a constraint. Particularly for countries, e.g., Japan, confronting a larger nuclear power--if not also one of the superpowers--the need to articulate a doctrine answering how the force could serve perceived security requirements might be the source of doubts. However, this constraint is likely to be less compelling in some strategic situations than in others. For example, it is likely to be less difficult for Taiwan, in contrast to Japan, to answer how possession of nuclear weapons might buttress its bargaining position vis-a-vis the CPR. Nor would it be compelling for those countries whose interest in nuclear weapons was not motivated by security-related concerns, e.g., to a Brazil seeking regional hegemony. Finally, the possible development of strategic rationales or doctrines, e.g., proportional deterrence, which appeared convincing to the proponent, if not to outside observers, should not be overlooked.

## The Possible Erosion of Key Constraints

Four possible near-term trends and developments which could erode key constraints upon candidate nuclear-weapon states should be briefly discussed. These are: the continued spread of bilateral and multilateral deals; the emergence of a nuclear-exports "grey market" and the breakdown of the NPT system; the development of technology for extracting uranium oxide from seawater; and the development and diffusion of

new, less capital-intensive and technologically demanding uranium enrichment technologies.

First, in each of the following nominally-safeguarded bilateral or multi-lateral nuclear deals, a candidate nuclear-weapon country has been or would be able to move closer towards a self-sufficient nuclear program: a joint French-Iranian uranium enrichment project, providing Iran with supplies of low enriched uranium; a multi-faceted bilateral deal between Brazil and the Federal Republic of Germany in which Brazilian natural uranium and a Brazilian purchase of up to eight nuclear power plants is to be exchanged for the plants, aid in uranium exploration, and, most importantly, technical assistance in building uranium enrichment, fuel fabrication, and plutonium reprocessing facilities; a nuclear cooperation agreement between Argentina and India; and, possibly, a joint Japanese-Australian-European-3rd-party uranium enrichment plant utilizing Japanese capital, Australian ore, and a European-3rd-country's technology.

Both the pursuit of commercial advantage and the difficulties of regulating competition for the future nuclear reactor exports market are likely to lead to additional deals of this kind. The possible precedent-setting sale to Brazil of sensitive technologies clearly illustrates the impact of such commercial pressures and competition in fostering a tendency toward the undisciplined dissemination of nuclear exports. Reportedly, the uranium enrichment and plutonium reprocessing facilities were "sweeteners" to make the purchase of German, as opposed to American, reactors more attractive to Brazil. The United States had been asked by Brazil to include such facilities and had refused. Moreover, if, as some analysts believe is likely, the reactor exports market grows less slowly than currently projected, these pressures would be intensified. In turn, entry into the ranks of the supplier countries of additional countries, including Japan and perhaps eventually India, could hinder efforts to regulate the nuclear exports market.

Furthermore, even when accompanied by safeguards agreements, the potentially negative effects of transferring sensitive facilities and technology are only reduced, not eliminated. The recipient has still acquired facilities that it would have had difficulties in indigenously developing. In addition, safeguards agreements can be violated. Nor is it clear how the problem of controlling future indigenously developed facilities, partly grounded upon the knowledge gained from working with the originally supplied facilities and technological "know-how," but also going beyond that knowledge, is to be solved.

Second, a nuclear-exports "grey market" characterized by undisciplined dissemination of nuclear exports, might eventually develop, eroding the NPT system. Exporting countries would choose to ignore past

violations of safeguards agreements and to supply fuel and equipment without "effective" restrictions upon future uses. And trained personnel would sell their services to any country ready to meet their price. At least initially, dummy corporations and comparable devices might be utilized to blur these violations of the NPT's export restrictions.*

The development of such a "grey market," arising from a combination of a global surplus of nuclear material and equipment, increased exporter competition for sales, the ready availability of funds, and "legitimized" by the growing belief that widespread proliferation was in any case inevitable, could occur. For example, a conjunction of increased enrichment capacity--new private U.S. plants, South Africa, Eurodif, Australia-Japan, Brazil-Germany--and a marked downward shift in reliance upon nuclear power due to mounting public opposition could result in an enriched uranium surplus in the late 1980s.

Or, given the belief that widespread proliferation was inevitable, each potential supplier might ask itself why it should be the one to sacrifice the pursuit of commercial advantage in support of a lost cause. As in the case of bilateral and multi-lateral nuclear deals, the effect would be to increase the relative nuclear self-sufficiency and independence from foreign pressures of candidate nuclear-weapon states. Moreover, the possible breakdown of the NPT system, brought about partly by these violations, would in turn erode current constraints upon actualizing a nuclear-weapon option.

The most extreme form of undisciplined dissemination would involve the sale or gift of nuclear weapons or the "blueprints" and special nuclear materials for their construction. Reportedly, Libya's Colonel Qaddafi attempted unsuccessfully in 1970 to purchase a nuclear weapon; more recently, he has been quoted as saying that the sale of nuclear weapons would be a normal event within the next several years. The prospect of financial gain from selling one or more weapons could be attractive to a new nuclear-weapon state, perhaps as a means of defraying its own costs. Or, the purpose of such a sale could be to solidify a political alliance or to gain political support. Thus, it has been argued that India might be willing to sell one or more nuclear weapons to the Arabs,

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*Two interesting parallels should be noted. First, considerable, and usually successful, efforts are routinely made in the wheat export business to hide the ultimate destination of a significant percentage of those exports. Second, Japanese companies use dummy corporations for their dealings with Taiwan. In an environment in which countries wanted to preserve the facade of adherence to the NPT, both types of measures might become prevalent.

if not for money, perhaps then for political concessions, possibly for non-support by the Arabs of Pakistan. Even so, some, if not many, potential sellers might be dissuaded by the fear that they themselves could become a target were the widespread sale of nuclear weapons to place these weapons in the hands of their own domestic opponents. Moreover, as long as the nuclear taboo had not yet been eroded, governments could be unwilling to engage in the sale of weapons. But would a government be the seller? Another possibility could involve unauthorized seizure and sale--again for profit--by a lesser level official or military man. The critical factor in this case would be the reliability of measures guarding against such unauthorized seizure.

Nor should the possible gift of a nuclear weapon by one country to another or to a local terrorist faction be ruled out. In a world in which the nuclear taboo was eroding, one might see, for example, a Moslem nuclear force, based upon the gift of nuclear weapons--with or without two-key procedures. Again, the danger would be that the gift could backfire, particularly if it involved an opposition group in a neighboring country. Imagine the PLO or the PFLP with a Libyan-supplied nuclear weapon--perhaps itself purchased on the black market. Would the PLO or the PFLP utilize that weapon against Israel, or to threaten some other Arab state--such as Lebanon or Jordan?* Here, too, actions by lesser level military men could be envisaged--perhaps from sympathy with the terrorist group's cause.

Third, for several key, technologically advanced, potential Nth countries--Germany, Italy, and Japan--lack of indigenous uranium ore is the sole limitation to acquiring a self-sufficient nuclear energy program. One means of reducing that constraint would be to negotiate deals for joint development of other countries' supplies, such as Germany has recently done with Brazil and Japan may do with Australia. A second means could involve development of technology for extracting uranium oxide from seawater. Thus, Japan is developing the means to extract approximately 3,400 tons of uranium oxide per year by 1990 (15 percent of projected demand) at a claimed expected average cost of $50-60/lb.**

Fourth, current trends appear to point towards the development by or transfer to potential Nth countries of a range of new enrichment technologies. Gas ultracentrifuge techniques or uranium isotope

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*The purpose of such a threat could be to guarantee freedom of action and insure against a repetition of September 1970 in Jordan.

**Nuclear News, December, 1974, p. 72.

separation are currently being developed and commercially applied by the West Germans and the Japanese. The South Africans and the West Germans have developed the Becker nozzle process, and the West Germans have contracted to export a variant of that technique to Brazil. The technical feasibility of laser isotope separation (LIS) has also been proven in laboratory tests. And, more importantly, as openly reported Israeli activities indicate, the difficulties not only for advanced, but also perhaps for medium technology countries, of indigenously developing LIS techniques could turn out to be less than might have been thought at first.*

If such new enrichment technologies become widely available to potential Nth countries by the late 1980s--whether by technology transfer or by indigenous development--several constraints could be eroded. To begin, access to domestically produced low-enriched uranium, even if from safeguarded facilities provided by others, would reduce the vulnerability of Nth countries to retaliatory action. It would no longer be possible for supplier countries to threaten to terminate fuel shipments were safeguarded reactors seized and then used to produce fissionable material for weapons.** More importantly, those Nth countries that had been able indigenously to develop one of these new enrichment technologies could then develop oralloy nuclear weapons. Moreover, even if the costs of doing so were too high for commercial application, they might be acceptable for a weapon program. Furthermore, because no violation of safeguards agreements covering foreign-supplied nuclear reactors and facilities would have occurred, the likelihood of punitive reaction by the nuclear-supplier countries is likely to be significantly reduced--assuming that the country was not a party to the NPT. Furthermore, access to oralloy would reduce the costs and difficulties of developing a crude but serviceable stockpile of nuclear weapons. And, for those Nth countries that sought to develop advanced oralloy fission weapons, the costs of doing so using enriched uranium produced by the new techniques, especially laser isotope separation, would be less than those involved with earlier more capital-intensive gaseous diffusion technology.

One final point regarding the potential impact of indigenous development of these new enrichment technologies is in order. In contrast to

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*The Becker nozzle process also appears likely to present few serious technical problems for a medium to high technology country. In contrast, problems in developing high-speed centrifuge machines which do not vibrate into self-destructive modes have plagued the Japanese and, until recently, the European centrifuge programs.

**Shipments of future reactors, components, and other nuclear technologies, of course, could still be terminated.

energy-, capital-, and scale-intensive gaseous diffusion plants, these new technologies, and particularly laser isotope separation, could lend themselves to covert weapon development.

To sum up, possible future technological developments and economic trends could erode several of the more important constraints upon acquiring a nuclear-weapon capability, much as the spread of civilian nuclear power has already done. However, before concluding that rapid and widespread proliferation is inevitable, it is important to remember that such developments might be more difficult than assumed, that those trends might not materialize, and that other constraints are likely to remain. Moreover, as suggested earlier, the scope and dynamics of proliferation will be determined by a complex pattern of interaction between a range of both constraints and pressures. Thus, in Section II of this report a set of alternative proliferation projections, based upon different assumptions about that pattern of interaction, is developed. As background to that analysis, Table 5 notes potential pressures or reasons, most critical constraints, and possible triggering events for those potential Nth countries that appear in those projections.

# TABLE 5

Potential Nth Countries: Possible Reasons, Constraints, and Triggering Events*

| Country | Potential Underlying Pressures or Reasons** | Most Critical Constraints | Possible Triggering Events | NPT Party |
|---|---|---|---|---|
| Algeria | Preserve regional status and influence; fashion | Limited technological and industrial base | Nuclearization of other countries; increased availability of necessary inputs | No |
| Argentina*** | Quest for regional status and influence; strengthen domestic morale; pressures from military | Risk of unauthorized seizure; reaction of regional opponents | Foreign crisis; domestic crisis; nuclearization of other countries | No |
| Australia | General deterrent effect; preserve regional influence; fashion | Dependence on foreign nuclear inputs; reaction of other countries | Reduction of alliance credibility; nuclearization of other countries | Yes |
| Brazil | Quest for regional and global status and influence; pressures from military | Risk of unauthorized seizure; dependence on foreign nuclear inputs | Nuclearization of other countries, changed perceptions of nuclear weapons' utility (as source of status and influence) | No |
| Chile | Fashion; preserve regional status and influence | Limited technological base; reaction of other countries | Nuclearization of other countries; increased availability of necessary inputs | No |
| Cuba | Fashion | Limited technological and industrial base; reaction of other countries | Increased availability of necessary inputs; nuclearization of other countries | No |
| Egypt | Deterrence of nuclear rival; buttress to bargaining position; quest for regional status and influence; strengthen domestic morale | Risk of unauthorized seizure; reaction of regional opponents and allies; limited technological and industrial base | Nuclearization of other countries; increased availability of necessary inputs | No |
| Greece | Deter nuclear rival; buttress to bargaining position; preserve regional status | Limited technological and industrial base; reaction of regional opponents | Increased availability of necessary inputs; breakdown of international constraints; nuclearization of other countries | Yes |
| India | Deterrence of nuclear rival; buttress to bargaining position; quest for status and influence; strengthen domestic morale; scientific momentum | Reaction of other countries; dependence on foreign nuclear inputs | Nuclearization of other countries; domestic or foreign crisis; weakening of international constraints | No |

*The following countries are those which appear in the proliferation projections developed in Section II.

**For certain countries the overt emergence of particular pressures or reasons would depend upon international and domestic changes such as are discussed in Section II. Thus, some potential pressures or reasons may well remain latent until, if ever, those changes occur.

***Most critical potential Nth countries--based upon analysis at the end of Section II--are placed in boxes.

## TABLE 5 (cont'd)

| Country | Potential Underlying Pressures or Reasons | Most Critical Constraints | Possible Triggering Events | NPT Party |
|---|---|---|---|---|
| Indonesia | Diversion of domestic attention; quest for regional status; fashion | Cost; limited technological and industrial base | Domestic crisis; nuclearization of other countries | No |
| Iran | Deterrence of nuclear rival; defense against invasion; buttress to bargaining position; quest for regional and global status and influence | Dependence on foreign nuclear inputs; reaction of allies and opponents | Nuclearization of other countries; weakening or breakdown of international constraints; foreign crisis | Yes |
| Iraq | Deterrence of nuclear rival; buttress to bargaining position; preserve regional status | Limited technological and industrial base; reaction of regional opponents | Nuclearization of other countries; increased availability of necessary inputs | Yes |
| Israel | Deterrence of nuclear rival; defense against invasion; buttress to bargaining position; weapon of last resort | Reaction of regional opponents, allies, and other nations | Reduction of alliance credibility; nuclearization of other countries; foreign crisis | No |
| Italy | Quest for status and influence; fashion; strengthen domestic morale; bureaucratic politics | Reaction of allies and other countries; problems developing credible nuclear strategy | Leadership change; reduction of alliance credibility; nuclearization of other countries | Yes |
| Japan | Deterrence of a nuclear rival; buttress to bargaining position; quest for global status and influence | Domestic public opposition; problems developing credible nuclear strategy; dependence on foreign inputs; reaction of other countries | Reduction of alliance credibility; domestic political change; foreign crisis; nuclearization of other countries | No |
| Libya | Buttress to bargaining position; nuclear intimidation of non-nuclear rivals; quest for regional status and influence | Limited technological and industrial base; reaction of opponents | Increased availability of necessary inputs | Yes |
| Nigeria | Fashion; quest for regional status | Limited technological and industrial base; cost | Increased availability of necessary inputs; nuclearization of other countries | Yes |
| North Korea | Deterrence of nuclear rival; buttress to bargaining position | Limited technological base | Increased availability of necessary inputs; nuclearization of other countries | No |
| Pakistan | Deterrence of nuclear rival; defense against invasion; buttress to bargaining position; strengthen domestic morale | Cost; limited technological and industrial base; reaction of regional opponent | Nuclearization of other countries; foreign crisis; increased availability of necessary resources | No |
| Philippines | Buttress to bargaining position; fashion | Cost; limited technological and industrial base | Nuclearization of other countries; increased availability of necessary inputs; breakdown of international constraints | Yes |
| Rumania | Weapon of last resort | Reaction of allies | Weakening of international constraints; nuclearization of other countries | Yes |

TABLE 5 (cont'd)

| Country | Potential Underlying Pressures or Reasons | Most Critical Constraints | Possible Triggering Events | NPT Party |
|---|---|---|---|---|
| Saudi Arabia | Deterrence of a nuclear rival; weapon of last resort; buttress to bargaining position; quest for regional influence | Limited technological and industrial base; reaction of regional opponents | Nuclearization of other countries; increased availability of necessary inputs | No |
| South Africa | Demonstrate national viability; quest for global status; strengthen domestic morale | Reaction of other countries | Foreign or domestic crisis; nuclearization of other countries; changed perception of nuclear weapons' utility (as source of status) | No |
| South Korea | Defense against invasion; deterrence of nuclear rival; intimidate non-nuclear rival | Reaction of allies and regional opponents; dependence on foreign nuclear inputs | Reduction of alliance credibility; weakening or breakdown of international constraints | Yes |
| Spain | Fashion | Dependence upon foreign nuclear inputs; reaction of other countries | Leadership change; nuclearization of other countries; breakdown of international constraints | No |
| Sweden | Defense against invasion; fashion | Problems developing credible nuclear strategy; domestic opposition | Changed perception of nuclear weapons' utility (as buttress to armed neutrality); nuclearization of other countries | Yes |
| Switzerland | Defense against invasion; fashion | Problems developing credible nuclear strategy; domestic opposition | Changed perception of nuclear weapons' utility (as buttress to armed neutrality); nuclearization of other countries | No |
| Syria | Deterrance of nuclear rival; preserve regional status and influence; buttress to bargaining position | Limited technological base; reaction of opponents | Nuclearization of other countries; increased availability of necessary inputs | Yes |
| Taiwan | Defense against invasion; buttress to bargaining position; demonstrate national viability; strengthen domestic morale | Dependence on foreign nuclear inputs; reaction of allies and other countries | Reduction of alliance credibility | Yes |
| Turkey | Intimidate non-nuclear rival; quest for regional status and influence; fashion | Limited technological base | Increased availability of necessary inputs; nuclearization of other countries | No |
| Venezuela | Preserve regional status and influence; fashion | Limited technological base | Nuclearization of other countries; increased availability of necessary inputs | Yes |
| West Germany | Deterrence of nuclear rival; buttress to bargaining position | Reaction of opponents and of allies; domestic opposition | Reduction of alliance credibility; weakening or breakdown of international constraints; foreign crisis; nuclearization of other countries | Yes |
| Yugoslavia | Weapon of last resort | Reaction of opponent | Foreign crisis | Yes |
| Zaire | Fashion | Limited technological base; cost | Increased availability of necessary inputs; nuclearization of other countries | Yes |

## II. Alternative Projections of the Scope and Dynamics of Future Proliferation

To delinate the possible scope of proliferation from 1975 to 1995 and to analyze its dynamics,* this section develops a set of alternative projections of future proliferation building upon Table 5.** In chart form each projection identifies future Nth countries, notes the type of program begun and its approximate timing, points to linkages among Nth country decisions to "go nuclear," and categorizes the strength and type of linkages between countries within a given proliferation chain.*** The accompanying text discusses the specific patterns of interaction among pressures and constraints that would explain the particular projections. In the course of that discussion, differing plausible assumptions are employed about: (1) the strength of and balance among various pressures for proliferation; (2) the influence of different constraints; (3) ways in which the constraints might erode and the pressures be intensified;

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*The detailed characteristics of future Nth country nuclear forces and programs are examined in Section III.

**More specifically, the following projections are discussed: 1) Limited but Steady Proliferation to 1995; 1A) Proliferation Phase II Is Kept From Taking-Off; 1B) Suppressed Proliferation Following Use of Nuclear Weapons; 2) Early to Mid-1980's Latin American Proliferation; 3) Libyan-Triggered Early 1980's Middle East Proliferation; 3A) Limited, Early to Mid-1980's Proliferation in Europe (No European Nuclear Force); 4) Early to Mid-1980's Emergence of a Nuclear-Exports "Grey Market"; 5) More Extensive Mid-1980's Global Proliferation: Repercussions of Growing Perceptions of American Unreliability; 6) Explosive Late 1980's-Early 1990's European Proliferation: A West German Nuclear-Weapon Program; 7) Widespread Mid- to Late 1980's Proliferation in Asia: Japan "Goes Nuclear"; 7A) Late 1980's Middle East Proliferation; 7B) Asian-Influenced, Late 1980's-Early 1990's Proliferation in Europe; 8) Late 1980's Erosion of Technological Constraints and the NPT System; 9) Mid- to Late 1980's Proliferation in Eastern Europe; 10) Widespread, Multi-Regional, Chain Reaction Proliferation to 1995.

***The lead-time indicated by the projection between one country's decision to "go nuclear" and that of others to which it is linked is of necessity an approximation. It is based upon not only an assessment of technological capabilities, but also upon a judgment concerning how long the political process might take to reach the decision to move towards a nuclear-weapon capability. That latter judgment varies importantly with the extent to which the second country would find it politically or militarily intolerable not to match rapidly the first country's decision.

(4) the presence and impact of possible proliferation turning-points; (5) the degree of proliferation momentum; and (6) the existence and effects of fortuitous occurrences. The projections should be read as a whole, therefore, in comparison with each other. By way of summary, the discussion explicitly compares Projection 10--"Widespread, Multi-Regional, Chain Reaction Proliferation to 1995"--with Projection 1--"Limited but Steady Proliferation to 1995"--in order to highlight the driving factors and developments that could lead to the less desirable former outcome. Finally, the concluding part utilizes the preceding set of projections to delineate critical candidate Nth countries, potential hostile pairs of Nth countries, and key proliferation turning-points. One purpose of this concluding discussion is to illustrate how an analysis of such proliferation projections could help to indicate ways of dampening proliferation momentum, severing key linkages within individual proliferation chains, and attempting generally to suppress future proliferation.*

## Projection 1: Limited but Steady Proliferation to 1995

This projection constitutes what could turn out to be the lower boundary of future proliferation: the slow, limited, but nonetheless steady growth in the number of nuclear-weapon countries. The interaction of the following factors could produce that outcome.

First, only limited erosion of the constraints against proliferation occurs. More specifically, the spread of sensitive nuclear technologies, e.g., plutonium separation plants, and the movement by potential Nth countries to reduced dependence upon foreign-supplied nuclear inputs is, with few exceptions, held in check.** With the exception of

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*Given the obvious difficulties of any attempt to project future events, no claim, of course, is made that the scope and timing of future proliferation will be mirrored by any one projection. Taken together, however, these projections should indicate the range of possible future proliferation events, their approximate timing, and the critical dynamics and sequences involved. Finally, it should be emphasized again that the extent to which any of these projections is reflected by future events would be influenced heavily by the extent to which efforts to prevent or retard proliferation are successfully pursued.

**Using bilateral deals and joint ventures, Iran, however, extends her access to European enriched uranium and nuclear technology. Additional bilateral deals between Iran and France, and then Iran and West Germany, in which secure access to oil is traded for the above materials and technologies, occur. Taiwan and Pakistan are also able, within the next few years, to acquire plutonium separation plants.

HI-2336/3-RR

Projection 1

Limited but Steady Proliferation to 1995

Iran's case--in which Iranian leverage over French and German access to oil and the joint-venture aspect of their bilateral deals causes France and Germany only to "make a show" of responding--violations of safeguards agreements meet with relatively strong responses and a nuclear-exports "grey market" does not emerge. Nor do new enrichment technologies increasingly spread to potential Nth countries lacking the capability indigenously to develop them.* In several key candidate countries, e.g., South Korea and initially Israel, fear of the responses of other nations, including both allies and opponents, continues to exist and to exert a deterrent effect. So does concern about the domestic economic and political repercussions of "going nuclear," particularly in Japan.

Second, for most potential Nth countries, security-related pressures for acquiring nuclear weapons are not sufficient to counter-balance existing constraints.** Moreover, with the exception of Taiwan,*** those countries dependent upon American security guarantees remain relatively confident in the credibility of those guarantees.****

Third, even though the decision of several countries to acquire nuclear weapons, particularly Iran, Argentina, and Brazil, is partly due to status and influence considerations, a widespread belief that nuclear

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*Israel by the mid- to late 1980s may have, however, developed its own LIS techniques. Brazil has received and assimilated the Becker-nozzle technique provided by its recent bilateral deal with West Germany.

**However, when combined with the status factors noted below, such regional insecurity and antagonism is sufficiently strong to lead to decisions by Pakistan, Iran, Argentina, and Brazil to develop nuclear weapons.

***In the late 1970's an American decision to formally recognize diplomatically the PRC appears to the Taiwanese to bear out their fears of American decoupling. The decision is made to develop nuclear weapons both to deter a Chinese People's Republic invasion and to reinforce their bargaining position and reduce the likelihood that nuclear blackmail by the PRC could erode domestic morale.

****This includes, in particular, South Korea, Japan, West Germany, and Israel. Each sees American decoupling from Taiwan as a unique event, recognizing long-standing realities, that does not point to comparable action in their cases. In Israel's case, however, even with such guarantees, pressures to "go nuclear" become irresistible once Iran's decision to do so has triggered actions by Egypt, Saudi Arabia, and Iraq.

weapons are a necessary accouterment of nationhood, an unavoidable prerequisite to international status and influence, does not emerge. Japan's continued decision not to develop nuclear weapons helps to prevent the growth of such a perception. So do efforts by the existing nuclear-weapon states to moderate the discriminatory aspects of the NPT system and to provide surrogate sources of international status and influence.

Fourth, due to the slow pace of proliferation, each new nuclear-weapon state or group of states can still be perceived as sui generis. A self-reinforcing momentum effect, which could increase the pressures and reduce the constraints upon the remaining potential Nth countries, does not emerge.

Fifth, those potential proliferation turning-points that occur--a second overt entry into the nuclear club (Taiwan), the first violation of safeguards agreements (Taiwan), and the first withdrawal from the NPT (Taiwan)--either turn out to have more limited consequences than expected or those consequences are defused diplomatically. Alternatively, other possible proliferation turning-points--e.g., successful use of a nuclear weapon by an Nth country, sale of a nuclear weapon, emergence of a nuclear-exports "grey market," and a Japanese decision in favor of "going nuclear"--do not occur.

Sixth, a European Nuclear Force (ENF) is created, centered around France, West Germany, and Britain. In turn, an ENF successfully absorbs pressures for proliferation in Europe, while reducing the number of wholly independent nuclear forces.*

Seventh, in those potential Nth countries which decide not to "go nuclear" because of the preceding set of factors, possible, but not predictable, internal changes do not reverse that calculation. For example, military coups do not bring to power new leadership committed to reassertion of national glory and status by acquisition of nuclear weapons.** Nor does the erosion of domestic morale and governmental legitimacy, to cite another possibility, lead an existing leadership to regard a nuclear-weapon program as a necessary buttress to its position.***

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*The difficulties of creating an ENF are discussed below and taken account of in alternative projections.

**If a military coup in Italy during the early 1980s brought to power a right-wing regime, it could decide to develop nuclear weapons for this reason.

***An eventual Indian decision to develop an overt nuclear-weapon program could be partly motivated by such domestic considerations.

## Projection 1A: Proliferation Phase II is Kept From Taking Off

In contrast to Projection 1, which assumed a limited erosion of international constraints, this variant assumes a multi-faceted reinforcement of external pressures against proliferation. It continues to assume the additional set of proliferation-limiting factors discussed in Projection 1. Both the scope and pace of proliferation are significantly reduced.

First, efforts among the major nuclear suppliers to reach agreement upon additional rules more stringently controlling nuclear power exports are successful. During 1977, the other suppliers come to accept the publicly reported American position proscribing export of such sensitive facilities as plutonium reprocessing and uranium enrichment plants. The idea of establishing regional nuclear centers is accepted. Thus, the Brazil-West Germany deal, involving the sale of both types of plant, and France's sale of a plutonium reprocessing plant to Pakistan, turn out to be anomalies and not harbingers of things to come. Buttressing these efforts, the nuclear suppliers announce their adherence to the principle of collective responsibility for enforcing safeguards agreements. That is, they warn that any violation of an agreement with one supplier would meet with sanctions adopted by all suppliers.

Second, India's next test of a nuclear explosive device in 1977 is met by a strong, coordinated response from the United States, Japan, West Germany, Great Britain, and Canada. Diplomatic condemnation is supported by the following actions: rechanneling economic assistance from India to other needy countries; a delay of nuclear fuel shipments to India's Tarapur reactors until the Indian Government provides convincing guarantees that it was not developing nuclear weapons; a similarly conditioned refusal to supply possibly necessary inputs for India's domestically developed and fabricated Kalpakkam reactors; and a warning to India that should it develop nuclear weapons and then find itself in a nuclear confrontation with China, the United States would not be drawn in on India's side.* Efforts to gain Soviet support of such a response prove unavailing, although the Soviets do not actively oppose it. Even without Soviet support, this coordinated response to

*The purpose of this warning is more to influence other potential Nth countries that depend heavily upon American security assistance and support, e.g., South Korea, than to influence India.

HI-2336/3-RR

Projection 1A

Proliferation Phase II is Kept From Taking Off

India's test has an important symbolic demonstration effect upon potential Nth countries. It is taken to indicate a readiness to use coercive measures to prevent proliferation.

Third, efforts to negotiate an Inclusive Comprehensive Test Ban Treaty are begun. It does not prove possible, however, to win the adherence of all six--including India--nuclear powers. Within India, domestic political reaction to the punitive response that followed India's test precludes agreement, and the French remain committed to independent testing.

Fourth, the preceding pressures tip the balance against an Indian decision to develop a nuclear-weapon capability in the early 1980s. Instead, an emphasis is placed upon developing the option to acquire an independent nuclear force at a later date. In turn, Pakistan remains non-nuclear. Nonetheless, a combination of scientific and technological momentum, a quest for global status and influence, and increasing nuclear self-sufficiency eventually lead to an overt Indian program in the 1990s. By this time, however, Pakistan has adjusted to its "second-place" position in South Asia and does not attempt to follow suit.

Fifth, heightened concern about a coercive international response to an overt Taiwanese nuclear-weapon program, as well as the effectiveness of strengthened suppliers' efforts to regulate dissemination of sensitive nuclear inputs, affect policy in Taiwan. Although security-related pressures still lead Taiwan to acquire nuclear-weapon capability, the Taiwanese Government is satisfied with development of a bomb in the basement. It is thought that such weapons, to be revealed if necessary, would suffice to prevent nuclear blackmail by the CPR.

Sixth, no longer influenced by earlier proliferation in South Asia--as it was in Projection 1--and, in any case, confronted by a greater likelihood of loss of access to nuclear technology and fuel for its civilian nuclear industry, Iran does not emerge as a nuclear-weapon state in the 1980s. Thus, the Iranian-triggered mid-1980s nuclearization of the Middle East, envisaged by Projection 1, is avoided. But, having by the 1990s acquired a relatively high degree of nuclear self-sufficiency, grounded upon its assimilation of the nuclear technology previously transferred to it and its continuing industrial and technological development, Iran moves tentatively toward acquisition of nuclear weapons. Motivated primarily by status and influence considerations, it detonates a PNE.

Seventh, both less concerned about jumping the gun on a now more constrained Brazil and itself under pressure from abroad, Argentina does not launch a nuclear-weapon program. Nevertheless, after Iran's decision to do so in the mid-1990s, Brazil--also primarily for status and

influence reasons--follows suit and launches a proto-nuclear-weapon program. Thus, according to this projection, by the mid-1990s the impact of the constraints against proliferation delineated here could erode, allowing various pressures to reanimate proliferation. Iran's decision might then trigger nuclearization of the Middle East, while a Brazilian decision might have a comparable effect in Latin America--but not until the late 1990s.

The likelihood of Projection 1A being borne out by future events depends not only upon its projected reinforcement of international constraints, but also upon the continued presence of that set of additional proliferation-limiting factors discussed in Projection 1. However, without a powerful shock such as the use of nuclear weapons could provide--see Projection 1B--a sufficient reinforcement of external constraints might not be forthcoming. Moreover, such a punitive and coercive anti-proliferation strategy could backfire, exacerbating status-related pressures to "go nuclear." Thus, in some cases--perhaps even India--the greater difficulties and costs of "going nuclear" might be outweighed by these increased pressures. Finally, as the following projections indicate, those additional limiting factors underlying Projection 1 could be undermined in various ways.

### Projection 1B: Suppressed Proliferation Following Use of Nuclear Weapons

This projection envisages superpower actions, triggered by the use of nuclear weapons in the early 1980s, to suppress proliferation. It also takes account of the possible dampening effects upon proliferation of unsuccessful use by an Nth country or of unauthorized use during an internal conflict. The following factors could be involved.

First, the balance of pressures and constraints discussed in Projection 1 leads to an initial spurt of proliferation. By the early 1980s, India, Pakistan, and Taiwan have emerged as overt nuclear-weapon countries. It appears likely that their actions will be followed by further proliferation.

Second, the first use of a nuclear weapon since Nagasaki occurs. Possible situations might include: use by either India or Pakistan following renewed conventional fighting between them; a nuclear-weapon accident; or unauthorized use during an internal revolt or civil war in India.*

*For a fuller discussion of possible Nth country situations involving the risk that nuclear weapons would be used, see Section IV.

Projection 1B

## Suppressed Proliferation Following Use of Nuclear Weapons

Third, galvanized to action, the nuclear suppliers reach agreement upon more restrictive regulations governing nuclear exports. They terminate further nuclear assistance to India, Pakistan, and Taiwan and make it clear that any future Nth countries also would lose access to advanced nuclear technology. The principle of collective responsibility for enforcing safeguards agreements is enunciated. In addition, West Germany now refuses to complete its previously-negotiated sale of plutonium reprocessing and uranium enrichment plants to Brazil. Instead, the suppliers arrange for development of a regional Latin American nuclear center as well as similar centers in other regions.

Fourth, the United States, the Soviet Union, and other nations band together to deter the remaining potential Nth countries from "going nuclear" and to prevent the existing Nth countries from assisting these other countries. A readiness to apply coercive measures, perhaps including even threats of military action, for that purpose is announced. For example, contingency plans for military action to prevent or to negate the sale of nuclear weapons are drawn up.

Fifth, the United States and the Soviet Union take various actions designed to reduce the incentives for developing nuclear weapons. These actions could include: a joint, unambiguous pledge of assistance to any non-nuclear-weapon country threatened or attacked by an Nth country;* pressures upon Brazil and Argentina to adhere fully to the Treaty of Tlateloco creating a Latin American nuclear free zone, as well as upon the Arabs and Israel to create a Middle East nuclear free zone; and the joint enunciation of a policy of phased movement towards a no-first-use of nuclear weapons posture.

Sixth, an Inclusive Comprehensive Test Ban Treaty is signed and ratified both by all of the nuclear-weapon states and by the critical potential Nth countries, i.e., Iran, Israel, Argentina, Brazil, West Germany, Japan, and Libya. A combination of pressures from the United States and the Soviet Union and the shock of nuclear-weapon use leads to such unanimous adherence.

The first use of nuclear weapons would be a proliferation turning-point. Conceivably, it might lead to such superpower actions as just described. However, even the shock of nuclear-weapon use might not suffice to overcome the competitive aspect of current superpower interaction. Both sides might remain unwilling to apply coercive pressure upon their respective allies or clients for fear of losing a competitive

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*Unlike their 1968 statements to the U.N. Security Council, this pledge would not be rendered meaningless by caveats and later interpretations.

advantage in their own controlled adversary relationship. Moreover, either or both the United States or the Soviet Union might not be willing to accept the costs and risks of efforts to reduce the incentives for proliferation as well as those of an ICTB.*

In the absence of a coordinated superpower response, the impact of nuclear-weapon use upon the scope and pace of proliferation would depend heavily upon how that use directly affected the perceptions of potential Nth countries.** Unauthorized use during an Indian civil war might reinforce constraints upon the leaders of those many potential Nth countries that are characterized by continuing military involvement in their domestic politics, punctuated by periodic military coups. Similarly, unsuccessful use might well reduce the attractiveness of "going nuclear." For example, if the first nuclear use since Nagasaki involved an accidental detonation of an Nth country's own nuclear weapon within its territory, that too might give pause to some potential Nth countries.*** Alternatively, if use of nuclear weapons, perhaps in an Indo-Pakistani war, did not significantly affect the outcome of the conflict, some other countries might be less inclined to "go nuclear." Concomitantly, if Indian first-use led to Chinese and American efforts--unopposed by the Soviet Union--in support of Pakistan, the perceived politico-military utility of having nuclear weapons could be reduced. Conversely, successful use would increase the perceived utility of nuclear weapons, intensifying pressures upon potential Nth countries to "go nuclear."

## Projection 2: Early to Mid-1980's Latin American Proliferation

Projection 2 envisages earlier, slightly more rapid and extensive proliferation in Latin America. Both Brazil and Argentina emerge as nuclear-weapon countries by 1990, and Chile moves in that direction before 1995. Due to the changed timing, moreover, the broader effects of Latin American proliferation are now somewhat less limited than in Projection 1. Several factors explain this projection.

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*Much would depend upon just how shocking such use was and upon whether Soviet and American perceptions of proliferation's direct threat to them were markedly intensified.

**It would also depend, but less importantly, upon the consequences of new nuclear-exports regulations, assuming that such use at least produced greater supplier restraint. See Projection 1A.

***But, it might only lead to efforts to develop safe weapons, not to no development at all.

HI-2336/3-RR

Projection 2

Early to Mid-1980's Latin American Proliferation

First, given Argentinian perceptions of Brazil's intention to develop nuclear weapons--reinforced by past Brazilian references to PNEs--Argentina jumps the gun on Brazil. Its purpose is to maximize whatever advantage its short-term lead in nuclear technology might provide before the transfer of technology from West Germany to Brazil eroded and then reversed that lead.* In turn, Brazil, motivated by the long-standing hostility between the two countries and by its desire for regional paramountcy, follows Argentina.**

Second, although the constraints upon both Argentina and Brazil are not sufficiently strong to balance the preceding pressures, those constraints do influence how the proliferation chain works itself out. Concerned about possible Brazilian military retaliation, Argentina attempts--with only partial success--to keep its preparations covert. Alternatively, forced, as she sees it, to respond, Brazil, nonetheless, attempts to reduce the weight of a likely punitive Germany response--given the safeguards within the West Germany-Brazil accord. She claims only to be engaged in PNE research and argues that lack of progress by the nuclear-weapon states to provide the benefits of PNEs nullified that accord's prohibition on peaceful explosions. Unmoved, West Germany reacts strongly, perhaps by stopping further implementation of the accord. This, in turn, leads Brazil to delay an overt declaration that it is building nuclear weapons, hoping that after the initial flap, West Germany will ease up on its refusal to continue supplying nuclear exports to Brazil.

Third, because of West Germany's relatively strong response, perceived international constraints upon other potential Nth countries are not eroded--and may well be strengthened. Concomitantly, taken by

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*Moreover, pressures from within the Argentine military could be a factor in that decision. The military of both Argentina and Brazil have been especially concerned about the other's nuclear-weapon ambitions.

**In this projection, a Brazilian nuclear-weapon decision precedes and influences an Iranian one. Thus, unlike in Projection 1, pressures for that decision arising out of Brazil's claim to eventual global influence are less significant than is her unwillingness to countenance Argentina becoming the only nuclear-weapon state in Latin America.

itself, the earlier emergence of proliferation in Latin America does not sufficiently increase proliferation momentum to shift the balance of pressures and constraints in these other countries. That is, countries such as South Africa are still able to distinguish their situation from that of these Latin American countries. A rush to "go nuclear," fueled by a sense that widespread proliferation is inevitable, does not take place. But, Brazil's decision to move toward acquisition of nuclear weapons under the guise of a PNE program does reinforce the pressures upon Iran by more closely associating in Iranian eyes a quest for great-power status and possession of nuclear weapons. For that reason, the broader effects of earlier Latin American proliferation are somewhat less limited than in Projection 1.

Given the balance of pressures upon Argentina and Brazil, the emergence of a Latin American proliferation chain in the early to mid-1980s is not unlikely. Nor is it unreasonable to postulate a strong West German response, assuming that at the time of Brazil's PNE initiative, proliferation has essentially occurred only in Asia and that proliferation momentum remains low.

### Projection 3: Libyan-Triggered Early 1980's Middle East Proliferation

Projection 3 depicts one way in which the earlier projection of limited but steady proliferation could break down. More specifically, Libyan acquisition of nuclear weapons, by purchase or co-production, is seen to increase both the pace and scope of proliferation.

First, confronted by a nuclear-armed Libya,* Israel responds by overtly commencing to build its own nuclear-weapon capability, using late 1970s covert preparations as a mobilization base. The basic Libyan-supplied security-related pressure for that decision is slightly reinforced, moreover, by the events surrounding Taiwan's earlier decision to develop nuclear weapons. That is, American decoupling from Taiwan is perceived by Israel as demonstrating the potential eventual unreliability of American support.

Second, elsewhere within the Middle East, an attempt is made to begin combining Egyptian technological and industrial experience with Saudi Arabian money in a joint Egyptian-Saudi nuclear-weapon program. Both security pressures and a concern for regional status motivate that

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*The question of who might sell Libya a nuclear weapon is discussed below.

Projection 3

## Libyan-Triggered Early 1980's Middle East Proliferation

endeavor. Especially within Egypt, pressures from domestic political and military groups reinforce the preceding reasons for not allowing Libya's actions to go publicly unchallenged. However, given the constraining effect of limited capabilities, the Egyptian-Saudi response, at least initially, is limited to announcing an intention to follow suit.*

Third, the preceding events further increase the pressures upon Iran to develop nuclear weapons. Security and status reasons associated with Iranian relations with Israel and the Arab world are now added to security concerns about Indian designs upon Pakistan, fears about Soviet pressures, competition with India for status and influence, and prestige considerations triggered by the acquisition of nuclear weapons by Pakistan, a fellow Moslem state. Moreover, the growing momentum of proliferation diffusely reinforces those specific pressures. As a result, Iran decides to "go nuclear" somewhat sooner than it might otherwise have done.

Fourth, the proliferation momentum generated when partial proliferation in Asia--India, Pakistan, and Taiwan--is quickly followed by nuclearization of the Middle East has consequences in other regions. Argentina's belief that it had better jump the gun on an eventually nuclear Brazil is reinforced. Iranian and Brazilian movement towards nuclear weapons, as well as the creation of an ENF, takes on added significance in South African eyes. Each appears now as part of a more general trend toward widespread proliferation, putting pressure on South Africa to follow suit lest its status decline.

Fifth, given the balance of pressures and constraints upon other potential Nth countries, however, the scope of proliferation remains limited in Asia and Europe. South Korean fears that an overt nuclear-weapon program would trigger American decoupling and a cut-off of nuclear technology and materials continues to outweigh the pressures, slightly reinforced, for a nuclear-weapon program.** A Japanese proliferation chain is not set off. At the same time, movement towards a European Nuclear Force absorbs whatever pressures for "going nuclear," especially within Italy, the Libyan acquisition might have stimulated among European countries.

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*This assumes that Egypt and Saudi Arabia are unable simply to buy or steal nuclear weapons, following Libya's lead. Were they able to do so, even more pressure would be placed upon Israel.

**Such fears of a loss of access to advanced nuclear technology and reactor fuel are reinforced by the fact that after Taiwan went nuclear, the United States did cut off sales to Taiwan.

In assessing the likelihood of the preceding projection, the critical question has to do with its assumption of Libyan access to nuclear weapons. As suggested in Section I, possible future sale or joint development of nuclear weapons should not be ruled out. And, paradoxically, either India or Pakistan might turn out to be a willing partner for Libya. In need of oil and political support, and perhaps fearful that Qaddafi's Moslem-orientation would lead him to support Pakistan, India might sell nuclear weapons to Libya or help it to produce them. Conversely, a Libyan-Pakistani connection in which Libyan resources supported a Pakistani nuclear-weapon program could be envisaged. In point of fact, Indian fear of such a Libya-Pakistan connection could lead to Indian attempts to preempt it by selling or jointly producing nuclear weapons with Libya.*

## Projection 3A: Limited, Early to Mid-1980's Proliferation in Europe (No ENF)

This projection is a variant upon the preceding one, depicting the possible consequences in Europe--without an ENF--of early partial proliferation in Asia, rapidly followed by Libyan-triggered nuclearization of the Middle East. Even in the absence of such a force, those consequences appear limited.

First, acquisition of nuclear weapons by Libya, a Mediterranean country which was once an Italian colony, triggers renewed debate about Italy's non-nuclear status. Simmering irritation over the perceived discriminatory aspects of the NPT system is strengthened by prestige considerations due to Libya's former colonial status.

Second, proliferation momentum reinforces long-standing, deeply-held Italian discontent with the NPT system. In particular, the growing number of new nuclear-weapon states raises questions about what purpose continued Italian adherence to the Treaty would serve.

Third, given limited constraints upon Italy, and in the absence of a European Nuclear Force to absorb Italy, the preceding pressures lead

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*It should be noted that a comparable rationale has not been entirely absent from American arms sales to developing countries that also sought Soviet arms aid.

HI-2336/3-RR

Projection 3A

## Limited, Early to Mid-1980's Proliferation in Europe (No European Nuclear Force)

to Italian withdrawal from the NPT.* However, this potential proliferation turning-point has fewer consequences than might be expected, both because the ensuing Italian nuclear-weapon program is grounded upon indigenous capabilities and because few countries see Italy as a status rival or a security threat. Thus, by itself, Italy's decision fails to have important demonstration effects, to increase significantly proliferation momentum, or to contribute to a closer association of prestige and possession of nuclear weapons.

Fourth, and most importantly, neither Italy's decision to develop nuclear weapons nor the more basic change represented by increased proliferation in Asia and the Middle East suffice to shift the balance of pressures and constraints in West Germany. In the absence of a marked increase in those pressures--e.g., such as erosion of American reliability might produce--or of a marked decrease in constraints--e.g., such as a Japanese nuclear-weapon program, eroding the onus of having begun and lost World War II, could engender--West Germany remains non-nuclear.

The weakness of Italy's commitment to the NPT system, evidenced by its reluctance to ratify the NPT, lends plausibility to the above projection once proliferation momentum has begun to grow. Similarly, it is reasonable to suggest that the events of Projection 3A are not sufficient to produce that fundamental change of West German thinking without which a decision to "go nuclear" would be highly unlikely. But, as several of the following projections indicate, such a change could occur.

### Projection 4: Early to Mid-1980's<br>Emergence of a Nuclear-Exports "Grey Market"

Projection 3 assumed that the sale to or joint production with Libya of nuclear weapons would be an isolated event. Projection 4 depicts the impact upon proliferation were the Libyan purchase to be symptomatic of or to lead to a more general breakdown of supplier restraint and to the emergence of a nuclear-exports "grey market." In either case, the result is likely to be a compression of the pace of proliferation, a change in its characteristics, and some increase in its scope.

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*If a post-Tito succession crisis led to the erosion of the West's position in the Adriatic, security-related pressures would reinforce the above reasons for developing nuclear weapons. The projection does not, however, explicitly take into account the possible existence of such additional pressures.

Projection 4

Early to Mid-1980's Emergence of a Nuclear-Exports "Grey Market"

First, by removing an important constraint upon certain potential Nth countries, the emergence of a "grey market" increases the pace of proliferation. Thus some countries which might in any case have decided to "go nuclear," but whose decision would have been slowed by concern about the consequences for their civilian nuclear programs, e.g., Iran, Brazil, and Spain, now do so earlier. Each no longer fears a cessation of important foreign-supplied nuclear materials and technology.

Second, growing proliferation momentum, stemming from the emergence of a "grey market" and the resultant belief that with reduced constraints additional countries are likely to develop nuclear weapons, increases the pressures upon Argentina and South Africa. Once again, the pace of proliferation is compressed: Argentina more rapidly jumps the gun on a now less-constrained Brazil; South African perceptions of the inevitability of proliferation are reinforced, leading it to join the trend sooner.

Third, increased availability of nuclear technology, including both technicians and sensitive facilities alters the nuclear-weapon programs of several countries. Thus, both Egypt-Saudi Arabia and Iraq are able to purchase components for a nuclear-weapon development program and are no longer restricted to verbal announcements of their intention eventually to match the programs of their regional antagonists.

Fourth, increased availability of necessary inputs and reduced concern about supplier retaliation shift the balance of pressures and constraints in other countries, e.g., Turkey, Greece, and perhaps Cuba, which now commence nuclear-weapon programs. However, in other potential Nth countries, the emergence of a nuclear-exports "grey market" does not suffice to change the balance of pressures and constraints. Thus, for example, South Korean fear of American decoupling should it "go nuclear" remains an overriding constraint, while in Japan the pressures for proliferation are still weak and the constraint of public opposition, in particular, unabated. A similar balance prevails in the remaining Asian countries, as well as among many countries in Latin America and Europe.

The first sale of a nuclear weapon or of critical components and design information is likely to be a possible proliferation turning-point. Following such a sale, a sense of futility could sweep through the existing supplier countries, leading them to turn a blind eye to violations or circumventions of safeguards agreements.* In addition, it could lead

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*Depending upon economic conditions at the time, these psychological pressures induced by a first sale or joint production of nuclear weapons could be exacerbated by commercial pressures.

to more extreme behavior, e.g., transfer of personnel and of design information being taken more or less routinely by new nuclear-weapon states, either for economic gain or political advantage. But, sale of a nuclear weapon could turn out to be so shocking an event that it would galvanize the supplier states and have the effect of strengthening, not weakening, nuclear-export restraints. Similarly, the risks of undisciplined dissemination, noted in Section I, might be readily appreciated by all nuclear-weapon states. Nonetheless, because this latter result cannot be assumed to be assured, serious attention has to be paid to the possible early-1980s emergence of a "grey market."

## Projection 5: More Extensive Mid-1980's Global Proliferation: Repercussions of Growing Perceptions of American Unreliability

Projection 5 envisages more extensive mid-1980s global proliferation stemming in large part from the spiralling effects of growing perceptions of American unreliability. More specifically, more extensive proliferation in Asia is followed by nuclearization of the Middle East. Both, in turn, lead to a build-up of proliferation momentum, increasing the pace and scope of proliferation in other regions. The following factors underlie that chain of events.

First, American termination of the Mutual Security Treaty with Taiwan and recognition of the Chinese People's Republic in the late 1970s* is followed several years later by the withdrawal of all but a token American troop presence in South Korea and of American tactical nuclear weapons. Increased pressures from the North against the South, no longer discouraged by either the CPR or the Soviet Union, occur. Skeptical about American reliability, South Korea withdraws from the NPT and launches a nuclear-weapon program grounded upon its prior preparations for developing nuclear weapons. Because a covert program--developing a bomb in the basement from special nuclear materials slowly siphoned off from the civilian nuclear fuel cycle--would provide at most a few rudimentary bombs by the mid-1980s, such a program is ruled out. Instead, South Korea accepts the international risks and domestic economic costs of such an overt program.**

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*These changes trigger an overt Taiwanese nuclear-weapon program.

**Loss by South Korea of access to enriched uranium to fuel its power reactors and to future nuclear technology imports would be an important, but bearable, economic set-back. South Korea is now planning by 1980 to produce 20 percent of her electricity from nuclear power, mostly with American supplied LWRs.

## Projection 5

## More Extensive Mid-1980's Global Proliferation: Repercussions of Growing Perceptions of American Unreliability

Second, during the late 1970s-early 1980s, American support of Israel also gradually declines. Egyptian hopes that increased direct American involvement in the Middle East would reduce that support have been borne out in the course of negotiating a series of "interim agreements," restoring most of the territory captured in 1967. "Project Independence's" failure and continued dependence on Arab oil leads as well to efforts to improve American relations with the Arabs. Finally, decreased entanglement with Israel also reflects the same basic public pressure for reduced involvement that led to disengagement in Asia.

Third, motivated by the existence of unresolved basic political issues, e.g., the fate of the West Bank and East Jerusalem, by pressures from more radical Palestinian groups, and by a sense of opportunity stemming from decreased American ties to Israel, Syria and Egypt step up their pressures upon Israel. Confronted by such renewed Syrian and Egyptian hostility in the early 1980s, Israel "makes public" covert nuclear-weapon preparations. When Arab hostility becomes overt preparation for war, Israel responds by testing a nuclear weapon. Israeli leaders hope that such an action would provide a deterrent shock and bring Arab preparations for war to a halt.* In this it is successful, but only at the expense of triggering Arab efforts to develop their own nuclear weapons.

Fourth, as in several of the earlier projections, growing proliferation momentum, stemming from more extensive proliferation in Asia followed by Middle East proliferation, reinforces the pressures upon Argentina to jump the gun on Brazil and leads to more rapid proliferation in Latin America. It also advances the timing of Iran's program, while adding to the pressures upon South Africa, Spain, and Turkey.

Fifth, also as in earlier projections, the balance of pressures and constraints upon such key potential Nth countries as Japan and West Germany is not sufficiently altered to lead to these countries "going nuclear." Both countries continue to distinguish American policy towards them from American policy towards other allies and friends: "we," so their thinking runs, "are vital American interests." Nonetheless, increased efforts to put together a European Nuclear Force gain momentum, serving to help contain as yet moderate West German anxieties.

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*A preemptive Israeli attack would be an apparent alternative to such attempted deterrent use. However, fears of completely losing American support could preclude it. Alternatively, mobilization and awaiting the Arab first strike could be ruled out because it would allow the Arabs to respond by defusing the war-scare, only to repeat the scenario three or four months later. The economic burden upon Israel of such repeated mobilizations would be quite heavy.

Setting aside its estimate of the effects upon Japan and West Germany--which are covered by succeeding projections--the main question about Projection 5 involves its assumption of increased American disengagement and growing perceptions of American unreliability. Recent official pronouncements do run counter to the projected shift away from South Korea. Nonetheless, by the late 1970s-early 1980s, the diffuse public concern to reduce American Asian involvement, currently shared by several prominent politicians, could make its presence felt. And, following a shift away from Taiwan, as is likely, it would become easier to begin a comparable--or what would be so perceived by the Koreans--disengagement from Korea. As for the Middle East, the factors noted above may well lead to decreased American reliability in Israel's eyes. Thus, Projection 5 does represent one possible way that Projection 1 might break down.

### Projection 6: Explosive Late 1980's-Early 1990's European Proliferation: A West German Nuclear-Weapon Program

Although the scope of proliferation in Projections 3, 4, and 5 was more extensive than in Projection 1, that scope was still somewhat limited. Projection 6 depicts one route to explosive global proliferation, culminating in the collapse of the NPT system and possible uncontrolled proliferation after 1995.

First, as in Projection 5, partial proliferation in Asia and nuclearization of the Middle East in the mid-1980s are followed by efforts to create a European Nuclear Force. Given the inherent difficulties in organizing such a force* and growing pressures that it be more than a symbol--due to previous limited American disengagement from Asia and fears of the same in Europe--these efforts are abortive.

Second, security-related pressures upon West Germany to develop nuclear weapons have been increasing slowly. The Soviets remain committed to control of Eastern Europe, and once again have proved willing to use force to maintain their hegemonical position. Their efforts to

*Among those difficulties could be: (1) financing the force; (2) agreement upon a targeting doctrine and rules for use; (3) coordination of an ENF with the pre-existing French, British, and American strategic forces; and (4) assuring sufficient national control over the trigger without building in a high likelihood of paralysis in a crisis.

HI-2336/3-RR

Projection 6

Explosive Late 1980's-Early 1990's European Proliferation:
A West German Nuclear-Weapon Program

reduce the flow of liberalizing ideas to the East have included pressures upon West Germany to control that flow. Moreover, the West German leadership and public have been shaken by events in Asia and the Middle East--including disengagement from Taiwan, a reduction of the American presence in South Korea, and a gradual decline in American support for Israel--perceived to demonstrate the possibility of future American unreliability. The number of American tactical nuclear weapons in Europe had already been reduced in the early 1980s, but in an abrupt and destabilizing manner. In this context, American discussions of an eventual no-first-use policy create added disquiet in West Germany.

Third, given the constraints upon a West German nuclear weapon program--existing treaties, psychological reluctance due to World War II war guilt, fears of a Soviet response, concern not to alienate other European countries, and fears of triggering that very American decoupling which is the original source of concern--West German officialdom shies away from an overt nuclear-weapon program. Nonetheless, the growing pressures lead key governmental and military officials to seek insurance against future insecurity. Thus, a small group within the elite arranges for covert German participation in and assistance to the emerging Brazilian nuclear-weapon program.* Although questions about the existence of clandestine German-Brazilian cooperation arise, sufficient doubt remains to hamper domestic and/or foreign opposition.**

Fourth, continued gradual erosion of its security position leads West Germany to withdraw from the NPT and to begin overt development of nuclear weapons. Alternatively, that decision is triggered by a specific security-shock--e.g., American enunciation of its intention to adopt a no-first-use policy within five years; Soviet pressures upon Berlin; another crisis in Eastern Europe which nearly spills over into West Germany; or clear-cut Soviet violation of the "SALT IV" accords, markedly shifting the strategic balance in the Soviet's favor. Reliance is placed upon both the continued, if eroding, American nuclear guarantee, and a rudimentary force based upon clandestine preparations to deter a hostile Soviet military response.

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*A South African-West German connection could be an alternative to covert cooperation with Brazil. It could involve building upon unofficial cooperation asserted to be emerging between these two countries. See The Observer (London), 5 October 1975.

**Although perhaps somewhat difficult to envisage in the present international political environment, such covert cooperation could occur in a more hostile one.

Fifth, the proliferation momentum generated by rumors of clandestine West German preparations reinforces status-related pressures in Italy, Spain, and South Africa. More importantly, West Germany's decision to develop nuclear weapons upsets the balance of pressures and constraints in Japan. Limitations that Japan had imposed upon herself because of her defeat, her war guilt, and world opinion lose their validity. In addition, a basic change in the world power structure and of the rules of the game is seen by the Japanese to have occurred. Following the West German lead, the Japanese "go nuclear."*

Sixth, partly animated by changing global fashions, renewed debate about whether to develop nuclear weapons emerges in Sweden and Switzerland. At the same time, the NPT is allowed to lapse in 1995, mortally wounded by the withdrawal of West Germany and Japan. Concomitantly, efforts to control the spread of nuclear technology take second place to the dictates of commercial advantage. After 1995, trade in nuclear-weapon materials, technologies and facilities, and perhaps even in nuclear weapons, comes to resemble the conventional weapon arms trade of today.**

As the preceding indicates, a West German decision to acquire nuclear weapons would be a critical proliferation turning-point. However, due to the strength of assorted constraints, that decision is likely to be taken only following a strong upward shift of critical pressures. But, given the possibility of basic changes of international politics over the next decade, such a shift should not be ruled out.

### Projection 7: Widespread Mid- to Late 1980's Proliferation in Asia: Japan "Goes Nuclear"

This projection and the two following variants upon it*** examine the potential consequences of a Japanese decision to develop nuclear weapons. It should become clear that such a decision would also be an

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*As discussed below, the Japanese are more than capable of such abrupt and far-reaching shifts when their environment is perceived to have changed.

**But, it is worth recalling that even today's conventional arms trade is not without its limits--though these too are eroding.

***Projection 7A: Asian-Influenced, Late 1980's Middle East Proliferation and Projection 7B: Asian-Influenced, Late 1980's-Early 1990's Proliferation in Europe.

HI-2336/3-RR

Projection 7

## Widespread Mid- to Late 1980's Proliferation in Asia: Japan "Goes Nuclear"

important proliferation turning-point, influencing proliferation trends in Asia, the Middle East (Projection 7A), and Europe (Projection 7B). Underlying Projection 7 are the following elements.

First, by the early 1980s, rising Japanese world involvement has brought home to Japan its vulnerability to raw-material embargoes and to interdiction of its shipping, the difficulties of a policy of benign disengagement from local conflict situations, and the limits of a purely economic foreign policy. Moreover, conflicts with both Taiwan and South Korea--each of which has by then acquired nuclear weapons--have grown in importance. Japanese rearmament, and even nuclear rearmament, becomes less unthinkable.

Second, rising domestic nationalism, partly fueled by continued frictions over the NPT system and its burdens upon Japanese nuclear industry, has also begun to change the climate of Japanese thinking about nuclear weapons. The postwar generation finds continued Japanese vulnerability to "weaker nations" less acceptable, is less willing to accept global second-class status and lack of attention to Japanese views, and begins to question the posture of systematic vulnerability. In addition, after 1985, this rising nationalism is stimulated by Japan's trillion dollar economy, surpassing the United States in per capita GNP.

Third, as more and more countries decide to develop nuclear weapons, proliferation momentum and status considerations begin to influence Japanese thinking. Although before such countries as India, Pakistan, Taiwan, and especially South Korea, as well as to a lesser extent, Brazil and Argentina, emerged as nuclear-weapon states, most informed Japanese opinion had rejected the notion that that event would affect Japanese global status and self-regard, once these countries <u>have</u> done so the Japanese are less sure of that conclusion.

Fourth, American termination of the Mutual Security Treaty with Taiwan has by the early 1980s already raised Japanese questions about American reliability. Growing disengagement from South Korea reinforces that concern about American willingness to risk damage for the sake of Japan.

Fifth, in the mid-1980s, a severe security shock, perhaps preceded by lesser shocks and/or by dissolution of the U.S.-Japan Mutual Security

Treaty due to Japanese-American friction, occurs. A Japanese change of government results--if it has not already taken place following earlier shocks--and the decision to develop nuclear weapons is made.

Sixth, coming on top of previous proliferation, and in itself causing concern, Japanese nuclear rearmament triggers nuclear-weapon programs in the Philippines, Indonesia, and Australia. The proliferation momentum generated by Japan's decision begins to erode the NPT system and make it easier for both potential nuclear-weapon states and nuclear suppliers to circumvent their safeguards obligations.* A "grey market," stopping short of sale of nuclear weapons, begins to emerge after 1990. Proliferation momentum, the increased fashionableness of nuclear weapons, and the growing perception that possession of nuclear weapons is needed for global status and influence reinforce pressures to "go nuclear" in potential Nth countries such as Brazil and South Africa.

Seventh, within Europe, however, the potential repercussions of Japan's emergence as a nuclear-weapon state are contained. Possible West German moves in that direction, no longer "beyond the pale," are absorbed within the emerging European Nuclear Force.

Skepticism about the likelihood of a Japanese decision to develop nuclear weapons is based upon various factors. Questions concerning the military utility of nuclear weapons, the adverse effects upon Japan's relations with other countries, the strength of domestic political opposition, and the favorable security environment are often raised. The last two questions are of particular importance: the strength of opposition within Japan to "going nuclear" and the lack of a sufficient sense of threat. Neither, however, is immutable--and both could change together.

On the one hand, perhaps more than any other country in the world, Japan displays a history of dramatic shifts in policy and international orientation--from feudalism to a centralized state, from democracy to dictatorship and back, from isolation to internationalism, and from militarism to quasi-pacifism. In addition, as much as any other nation, she displays cyclic shifts in attitude from self-deprecation to pride, from resentment of foreigners to over-respect, from paternal concern for developing Asian nations to assertive contempt for her international inferiors.

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*For example. Libya, Turkey, and Greece now find it easier to develop nuclear weapons, as do others.

On the other hand, the extent to which current Japanese views on nuclear weapons depend on an international context in which the nation feels relatively secure cannot be easily overstated. Were that context, or Japanese perceptions of it, to change, the Japanese capability for extraordinary, and extraordinarily rapid, changes of perspective on even such fundamental issues could take over. And, it would be highly questionable to conclude that Asia and the world are so locked into their present situations that no such international stimuli for dramatic Japanese reorientations could occur.

## Projection 7A: Asian-Influenced, Late 1980's Middle East Proliferation

Projection 7 assumed that the nuclearization of the Middle East preceded Japan's decision to develop nuclear weapons. Projection 7A depicts the likely impact within the Middle East of Japan's decision, if it is assumed that none of the earlier projections of a nuclear Middle East have been borne out by ensuing events. More specifically, Middle East proliferation now follows Asian proliferation in the late 1980s.

First, by the early 1980s, various pressures move Iran towards development of nuclear weapons: fear of dismemberment of the Pakistani buffer-state, leading to direct confrontation with a nuclear-armed India; traditional fears of the Soviet Union; the quest for recognition as the "fifth great power"; a decision by Pakistan, its fellow Moslem state, to develop nuclear weapons; and Iranian desires for political and military hegemony in the Persian Gulf. Japan's decision to develop nuclear weapons further reinforces the status and influence-related pressures for developing nuclear weapons. It does so both by lending credence to the belief that status requires nuclear weapons and by reinforcing proliferation momentum.

Second, Japan's decision both seriously erodes the NPT system--which, after all, was targeted primarily against West Germany and Japan--and contributes to decreased willingness on the part of nuclear suppliers to rigidly enforce safeguards agreements. Why sacrifice commercial gain and political support in a losing cause? In so doing, it lessens the constraints upon Iran. Now that Japan has left the NPT system, and given Iranian oil leverage,* Iran concludes that neither France nor West Germany

*In the late 1980s, Iran is still exporting sufficient oil to be able to use those exports as a source of leverage. In fact, Iranian awareness that by 2000, according to current estimates, its oil reserves could be depleted might lead it to act at this point, while such leverage still existed.

## Projection 7A

## Asian-Influenced, Late 1980's Middle East Proliferation

is likely to resist forcefully Iranian efforts to circumvent safeguards. Whatever fears that it might have had that France and Germany would refuse to continue selling it nuclear materials and facilities are sharply reduced.

Third, this changed balance of pressures and constraints leads Iran to withdraw from the NPT and to begin to develop nuclear weapons. That, in turn, triggers regional proliferation in the Middle East.

The critical assumption of this projection is that proliferation in the Middle East would not have occurred by the time Japan became a nuclear-weapon state. In light of the preceding projections, offering a variety of routes to Middle East proliferation, that assumption is not without problems. However, once it is granted, it is not unreasonable to conclude that Japan's decision and, if needed, the ensuing erosion of constraints upon Iran would probably be followed quickly by an Iranian decision to develop its own nuclear-weapon capability.

## Projection 7B: Asian-Influenced, Late 1980's-Early 1990's Proliferation in Europe

This projection is also a variant upon Projection 7 and depicts widespread proliferation in Europe triggered by Japan's emergence as a nuclear-weapon country. That is, in turn, followed by collapse of the NPT system by 1995. It assumes that the effort to create a European Nuclear Force has proved unsuccessful. The following factors would be involved.

First, Japan's decision markedly alters the internal political and psychological constraints upon a comparable West German decision. Earlier self-imposed foreign policy restraint, stemming from the loss of World War II, war guilt, and a desire to be "good Germans," had already begun to erode in the 1970s. It continued to do so during the early 1980s as the postwar generation rose to power. Japan's action eliminates the final vestige of such psychological restraint. In turn, it leads to a period of internal debate, during which the remaining political constraints are eroded. Talk of a West German decision to develop nuclear weapons becomes respectable.

Second, the Japanese decision also increases the pressures to develop nuclear weapons within West Germany. Those persons favoring development point to the security shocks which led to Japan's decision and ask questions about the reliability of the United States. It is also argued that nearly fifty years after World War II West Germany should rely upon itself for defense. In addition to its demonstration

HI-2336/3-RR

Projection 7B

Asian-Influenced, Late 1980's-Early 1990's Proliferation in Europe

effects, Japan's action raises status and prestige issues--can West Germany remain non-nuclear in a world in which all other great powers have nuclear weapons? Growing proliferation momentum also reinforces a sense of West Germany's anomalous position--non-nuclear in a world of nuclear powers, mini-powers, and aspirant nuclear powers.

Third, after several years of debate, West Germany withdraws from the NPT and begins to develop nuclear weapons. Widespread proliferation in Europe follows. Status considerations and proliferation momentum lead Spain and Italy--if Japan's decision and the abort of the ENF had not been followed by an earlier decision by Italy--to follow suit. The now-inexorable momentum to proliferation carries Sweden and Switzerland along, following a period of renewed debate. "Going nuclear" is now "in fashion."

Fourth, the NPT is allowed to lapse in 1995: Japan and West Germany, its two key targets, are now nuclear-weapon states. If earlier events, including especially Japan's decision, have not already led to open, unrestricted trade in nuclear exports, that also emerges now. Earlier decisions to cease selling nuclear facilities, materials, and technology to past Nth countries are rescinded. Although most countries continue for political and prudential reasons not to sell weapons, few questions are asked about the purposes to which other nuclear exports could be put.

Because Japanese acquisition of nuclear weapons would almost certainly be an electrifying event in West Germany, shifting the context of German thinking about nuclear weapons, the critical aspect of this projection is, of course, its initial assumption of a Japanese decision to develop nuclear weapons. And, as argued above, that assumption should not be too heavily discounted. International political life has seen far more unlikely events come to pass.

### Projection 8: Late 1980's Erosion of Technological Constraints and of the NPT System

Projection 8 depicts the potential effects of an erosion of technological constraints and of the NPT system in the late 1980s. Such an erosion could involve: widespread diffusion, frequently with inadequate safeguards provisions, and indigenous development of laser isotope separation technology (LIS) and other new enrichment technologies; increased reluctance on the part of nuclear suppliers to react strongly

HI-2336/3-RR

Projection 8

Late 1980's Erosion of Technological Constraints and the NPT System

to safeguards violations;* increased competition to export nuclear reactors, using sensitive facilities as "sweeteners"; an emerging "grey market" in critical techniques and personnel; and mounting withdrawals from the NPT. However, weapons themselves are not sold. And, the ability of some countries to absorb or to purchase newly available technologies is limited by their own low level of economic and technological development. Moreover, Japan and West Germany remain non-nuclear.** These latter factors warrant the reference to "erosion" as opposed to "collapse." Even so, the consequence of that erosion, as indicated by Projection 8, is to increase the pace, characteristics, and scope of proliferation.

First, the timing of proliferation is more compressed. Countries such as Turkey, Greece, Spain, and Chile, whose possible decision to develop nuclear weapons eventually would have been retarded by technological constraints, foreign dependence, and fear of losing foreign-supplied inputs, now move more rapidly to become nuclear-weapon states.

Second, the characteristics of proliferation are also changed. Increased availability of critical inputs permits actual development as opposed to sluggish preparations. For example, Turkey and Greece, as well as Egypt-Saudi Arabia, Chile, and Iraq, are now able to launch serious programs. Access to oralloy also allows development of uranium fission weapons, variously easing Nth country nuclear-weapon programs. More importantly, relatively more advanced Nth countries, e.g., India and Israel, more rapidly begin development of fusion weapons.

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*Earlier punitive actions that might have occurred, e.g., cessation of exports of enriched uranium fuel to Taiwan, might now be neutralized by the United States or by new suppliers.

**A combination of domestic opposition and limited sense of threat in the case of Japan, and of fear of external reprisal and the availability of an ENF in the case of West Germany, are important factors in their respective decisions.

LIS also facilitates clandestine nuclear-weapon development, perhaps in Nigeria and Zaire, both of which might fear a South African preventive strike.

Third, the scope of proliferation expands. Countries such as Syria, Venezuela, Nigeria, and Zaire which had previously been heavily constrained by limited technological capabilties, fear of reprisal, and/or the costs involved, begin developing nuclear weapons. More generally, increased proliferation momentum and a growing fashion in "going nuclear" reinforce or create pressures for developing nuclear weapons.

Fourth, by the early 1990s the NPT system has seriously eroded but not collapsed. A combination of other constraints, e.g., cost, domestic opposition, fear of hostile action by neighbors, and insufficient pressures for developing nuclear weapons prevents a mass stampede into the "nuclear club." Put otherwise, the era of the nuclear six-gun is not quite here: the erosion of technological constraints and the growth of proliferation momentum stop short of producing that outcome. Moreover, as noted, Japan and West Germany remain non-nuclear.

As argued in Section I, a range of factors could lead by the late 1980s to an erosion of technological constraints, the growing readiness of nuclear suppliers to overlook or circumvent safeguards obligations, and the emergence of a nuclear-exports "grey market," including the availability of nuclear mercenaries. Thus, even without the emergence of Japan and West Germany as nuclear-weapon states,* growing proliferation momentum by then is likely to intensify the sense of futility about efforts to prevent proliferation. Moreover, commercial pressures are unlikely to have grown weaker, and may actually have continued to intensify. The pro forma or ineffective effort to invoke safeguards following decisions by Iran and Brazil to develop nuclear weapons--envisaged by this projection--is not unlikely. It, too, would probably decrease the likelihood of future strong responses by the nuclear suppliers. Growing pressures from Third World countries against domination by the industrial powers and challenging the legitimacy of retaliation is also likely to erode the NPT's enforcement aspects.** Finally, regarding the assumed spread of LIS techniques, LIS could well by the early 1990s, if not sooner, be increasingly available.

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*It may be recalled that in earlier projections the emergence of a "grey market" and the eventual collapse of the NPT was seen to follow Japan and West Germany's decisions to "go nuclear."

**The question of what gives the large nuclear powers the right to prevent or punish proliferation is likely to be raised--as it is now.

## Projection 9: Mid- to Late 1980's Proliferation in Eastern Europe

This projection depicts proliferation in Eastern Europe, a possibility that is often overlooked or dismissed out-of-hand. It could occur in the following manner.

First, Soviet efforts to determine the outcome of the post-Tito succession crisis are aborted, partly because of American warnings that overt intervention could gravely upset improving Soviet-American relations. Nonetheless, the post-Tito elite is shaken by renewed evidence that the Soviets have not given up their hopes of forcing Yugoslavia back into the Soviet-dominated Eastern European bloc.

Second, clandestine preparations for an eventual Yugoslav nuclear-weapon program begin in the early 1980s. Neither American support nor the threat of partisan warfare, both of which had restrained the Soviets earlier, are considered to be an adequate long-term solution to the risk of Soviet military intervention. Gallois-type arguments about the benefits of even a small nuclear force are carefully circulated among a few top policymakers. The French are induced to sell additional reactors and to assist in developing a plutonium separation plant, publicly justified in terms of preserving expensive fuel for eventual plutonium recycling.

Third, in the mid-1980s, Yugoslavia withdraws from the NPT and unveils a rudimentary nuclear-weapon capability. Its ability to get away with it, assuming the Soviets do not respond, triggers Rumanian covert efforts. Rumania not only seeks a last resort capability to deter the Soviets, but it is influenced also by growing proliferation momentum. However, Rumania stops short of an overt demonstration of a nuclear-weapon capability, preferring instead to develop a "bomb in the basement" whose existence as a weapon of last resort could be unveiled as a *fait accompli* in a crisis.

Given the security pressures upon Yugoslavia and Rumania, it is not implausible to expect them to at least consider the potential benefits of a nuclear-weapon capability. Moreover, a proportional deterrence, last resort posture might appear attractive in their eyes. The critical questions to them are likely to be: (1) would a clandestine program be detected prematurely? and (2) if so, how would the Soviets respond? That very fear of the Soviets which could animate clandestine preparations might, conversely, make such preparations appear to be too risky an undertaking.*

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*This projection assumes that in the absence of a West German program such fear deters East German efforts to acquire nuclear-weapons. Should an earlier projection including West German acquisition be borne out, East Germany might begin, nonetheless, clandestine preparations.

HI-2336/3-RR

Projection 9

## Mid- to Late 1980's Proliferation in Eastern Europe

## Projection 10: Widespread, Multi-Regional, Chain Reaction Proliferation to 1995

Projection 10 brings together in one projection most of the trends and events highlighted individually in prior projections. In contrast to Projection 1--"Limited but Steady Proliferation to 1995"--it depicts the chain reaction emergence by 1995 of a nuclearized world and the collapse of the NPT system. To sum up the preceding analysis of the scope and dynamics of possible future proliferation, the following briefly reiterates those driving forces, fully discussed and illustrated above, that could produce widespread, multi-regional chain reaction proliferation.*

First, a continuing erosion and eventual breakdown of external constraints against proliferation occurs. The continued spread of nominally-safeguarded export deals, including the sale of sensitive facilities, eases efforts by potential Nth countries to reduce their dependence upon foreign nuclear inputs and to develop self-sufficient nuclear programs. Moreover, the nuclear suppliers fail to act strenuously to inflict sanctions upon those nations that circumvent or abrogate safeguards agreements. Instead, a nuclear-exports "grey market" emerges, characterized at first by a readiness to continue supplying critical fuel and facilities even to safeguards violators, then by the widespread availability of "scientific mercenaries," and finally by the sale or transfer among nations of either nuclear weapons or the "blueprints" and special nuclear materials needed for their fabrication. Concomitantly, no effort is made by either a coalition of Western industrialized states or by the superpowers to deter additional proliferation by inflicting costs upon the first Nth countries.

Second, internal constraints upon proliferation also weaken. For example, the spread of nuclear technology and the process of economic development gradually increase the level of technological sophistication and expand the industrial base in low technology potential Nth countries. Or, to take a more striking example, a Japanese decision to "go nuclear" shatters self-imposed internal constraints in West Germany, or conversely, a West German decision has that effect in Japan.

Third, security-related pressures to develop nuclear weapons are steadily intensified. For certain potential Nth countries, this

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*Of necessity, there is some overlap among the following categories of driving forces. In particular, certain of the events that come under the heading of proliferation turning-points also are subsumed elsewhere. Given their significance, however, they warrant additional emphasis as such turning-points.

HI-2336/3-RR

Projection 10

Widespread, Multi-Regional, Chain Reaction Proliferation to 1995

intensification stems from growing perceptions or fears of American unreliability. In other cases, that increased sense of threat is either reinforced by or derived from a decision by a regional opponent to develop nuclear weapons. Finally, security shocks, specific to the hostile confrontation in question, also intensify such security-related pressures.

Fourth, the ever-growing importance of status and influence-related pressures also drives widespread proliferation. Possession of nuclear weapons comes to be perceived as an unavoidable prerequisite to regional and international status and influence. "Going nuclear" is increasingly in fashion and possession of nuclear weapons comes to be seen as a necessary accouterment of nationhood.

Fifth, spiralling proliferation momentum heightens the fashionableness of possessing nuclear weapons. It also reinforces the preceding security and status and influence-related pressures. Furthermore, in some cases, that momentum, compressing the pace of proliferation, intensifies the pressures to jump the gun on traditional opponents who might themselves be thinking of eventually developing nuclear weapons.

Sixth, varied and far-reaching proliferation turning-points occur.* For example, critical countries such as Iran and Japan begin to develop nuclear weapons, setting off bursts of proliferation. Or, nuclear weapons are used successfully by an Nth country without triggering coordinated great power efforts to suppress or at least markedly impede additional proliferation.

Seventh, renewed efforts, after the initial spurt of proliferation, to create a European Nuclear Force prove abortive. Growing pressures upon Italy, but more importantly upon West Germany, to develop nuclear weapons cannot be absorbed within a multi-national framework. In turn, the emergence of a West German nuclear force contributes to the breakdown of the NPT system, the growth of a "grey market," and reinforces pressures upon various other potential Nth countries.

Eighth, the presence of fortuitous, but compelling, domestic reasons for developing nuclear weapons also adds to the scope of proliferation. In certain cases, these reasons critically reinforce security or status and influence pressures; while in others, they independently determine nuclear-weapon policy.

In addition, two other related driving forces should be mentioned. These are: poor policy and/or bad luck. (Table 6 summarizes these factors.

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*For a complete list, see Table 12 below.

TABLE 6

Driving Forces of
Possible Future Proliferation

1. Erosion and eventual breakdown of external constraints
2. Weakening of internal constraints
3. Intensification of security-related pressures
4. Ever-growing importance of status and influence-related pressures
5. Spiralling proliferation momentum
6. Occurrence of varied and far-reaching proliferation turning-points
7. Failure of renewed efforts, after the initial spurt of proliferation, to create a European Nuclear Force
8. Presence of fortuitous, but compelling, domestic reasons
9. Poor policy and/or bad luck

## Critical Countries, Hostile Pairs, and Proliferation Turning-Points

Utilizing the set of proliferation projections developed in this section, this concluding part (1) delineates critical countries in terms of their impact upon the scope and pace of possible future proliferation, (2) distinguishes hostile pairs of future Nth countries and indicates approximately when such new nuclear confrontations might arise, and (3) takes note of key proliferation turning-points. In doing so, it not only refines further our understanding of the dynamics of proliferation, but also illustrates how development and analysis of proliferation projections could support efforts to retard proliferation. That is, by indicating key proliferation linkages and turning-points, the following focuses attention upon critical sequences and events whose occurrence would have to be prevented in an attempt to halt proliferation first at the lowest possible plateau or, failing that, at successively less restricted plateaus. Tables 7-12 summarize that analysis and are self-explanatory.

## TABLE 7

## Impact Upon Future Proliferation of Potential Nth Countries

| Potential Nth Country | Number of Projections Occurs Within | Total Number of Future Proliferation Decisions It Directly Influences (of 282)* | Number of Decisions That Might Not Occur Without Its Decision |
|---|---|---|---|
| Brazil | 14 | 42 | 21 |
| Iran | 14 | 41 | 23 |
| India | 15 | 36 | 19 |
| Israel | 15 | 36 | 17 |
| Taiwan | 15 | 35 | |
| Argentina | 13 | 32 | 7 |
| Egypt-Saudi Arabia | 13 | 29 | |
| Japan | 6 | 28 | 29 |
| Libya | 8 | 22 | 12 |
| South Africa | 9 | 16 | |
| Pakistan | 14 | 14 | |
| West Germany | 3 | 14 | 7 |
| South Korea | 15 | 11 | 1 |
| Turkey | 11 | 9 | 9 |
| Italy | 6 | 5 | |
| Iraq | 13 | 4 | |
| Chile | 12 | 2 | |
| Spain | 10 | 2 | |
| Indonesia | 6 | 1 | |
| Yugoslavia | 1 | 1 | |

Remaining countries do not reinforce directly decisions by other countries.

*To reiterate, a proliferation decision would be any of the following: announced intention, bomb in the basement, clandestine preparations, que PNE, renewed debate, a purchase or theft, and overt development.

# TABLE 8

## Most Critical Countries (By Projection)

| | Projection | Number of Individual Proliferation Decisions w/in the Projection | Most Critical* Countries | Number of Those Future Proliferation Decisions That Might Not Occur Without Its Decision |
|---|---|---|---|---|
| 1. | Limited but Steady Proliferation to 1995 | 11 | India<br>Iran | 6<br>4 |
| 1a. | Proliferation Phase II Is Kept from Taking-Off | 6 | Iran | 1 |
| 1b. | Suppressed Proliferation after Use of Nuclear Weapons | 5 | India | 1 |
| 2. | Early to Mid-1980's Latin American Proliferation | 12 | Iran<br>Argentina | 4<br>2 |
| 3. | Libyan-Triggered Early 1980's Middle East Proliferation | 17 | Libya<br>Brazil | 4<br>2 |
| 3a. | Limited, Early to Mid-1980's Proliferation in Europe | 17 | Libya<br>Brazil | 4<br>2 |
| 4. | Early to Mid-1980's Emergence of a Nuclear-Exports "Grey Market" | 21 | Libya<br>Argentina | 4<br>3 |
| 5. | More Extensive Mid-1980's Global Proliferation: Repercussions of Growing Perceptions of American Unreliability | 18 | Israel<br>Brazil | 3<br>2 |
| 6. | Explosive Late 1980's-Early 1990's European Proliferation: A West German Nuclear-Weapon Program | 22 | West Germany<br>Israel | 3<br>3 |
| 7. | Widespread Mid- to Late 1980's Proliferation in Asia: Japan "Goes Nuclear" | 22 | Japan<br>Israel | 3<br>3 |
| 7a. | Asian-Influenced, Late 1980's Middle East Proliferation | 22 | Japan | 11 |
| 7b. | Asian-Influenced, Late 1980's-Early 1990's Proliferation in Europe | 26 | Japan<br>Brazil<br>Israel | 6<br>3<br>3 |
| 8. | Late 1980's Erosion of Technological Constraints and the NPT System | 27 | Brazil | 4 |
| 9. | Mid- to Late 1980's Proliferation in Eastern Europe | 24 | Japan<br>Israel | 3<br>3 |
| 10. | Widespread, Multi-Regional, Chain Reaction Proliferation to 1995 | 32 | Iran<br>Japan | 6<br>6 |

*Those countries whose decision not to proliferate would reduce by at least 10 percent (excluding that initial decision) the scope of future proliferation within the particular projection.

TABLE 9

## Critical Sets of Potential Nth Countries* (By Projection)

| | Projection | Number of Proliferation Decisions | Critical Set of Countries (I) | Critical Set of Countries (II)** |
|---|---|---|---|---|
| 1. | Limited but Steady Proliferation to 1995 | 11 | India | Iran and Argentina |
| 1a. | Proliferation Phase II is Kept from Taking-Off | 6 | India and Taiwan | Taiwan and Iran |
| 1b. | Suppressed Proliferation after Use of Nuclear Weapons | 5 | India and Taiwan | Pakistan and Taiwan |
| 2. | Early to Mid-1980's Latin American Proliferation | 12 | India and Argentina | Iran and Argentina |
| 3. | Libyan-Triggered Early 1980's Middle East Proliferation | 17 | Libya, India, and Argentina | Libya, Iran, and Argentina |
| 3a. | Limited, Early to Mid-1980's Proliferation in Europe | 17 | Libya, India, and Argentina | Libya, Iran, and Argentina |
| 4. | Early to Mid-1980's Emergence of a Nuclear-Exports "Grey Market" | 21 | Libya, India, and Argentina | Libya, Argentina, and Iran |
| 5. | More Extensive Mid-1980's Global Proliferation: Repercussions of Growing Perceptions of American Unreliability | 18 | Israel, India, and Argentina | Israel, Iran, and Argentina |
| 6. | Explosive Late 1980's-Early 1990's European Proliferation: A West German Nuclear-Weapon Program | 22 | West Germany, Israel, India, and Argentina | West Germany, Israel, Iran, and Argentina |
| 7. | Widespread Mid- to Late 1980's Proliferation in Asia: Japan "Goes Nuclear" | 22 | Japan, Israel, India, and Argentina | Japan, Israel, Argentina, and Iran |
| 7a. | Asian-Influenced, Late 1980's Middle East Proliferation | 22 | Japan, Argentina, and India | Japan and Argentina |
| 7b. | Asian-Influenced, Late 1980's-Early 1990's Proliferation in Europe | 26 | Japan, India, Israel, and Argentina | Japan, Israel, Iran, and Argentina |
| 8. | Late 1980's Erosion of Technological Constraints and the NPT System | 27 | India, Israel, and Argentina | Israel, Iran, and Argentina |
| 9. | Mid- to Late 1980's Proliferation in Eastern Europe | 24 | Japan, Israel, India, and Argentina | Japan, Israel, Argentina and Iran |
| 10. | Widespread, Multi-Regional, Chain Reaction Proliferation to 1995 | 32 | India, Japan, and Argentina | Japan, Iran, and Argentina |

*A combined decision not to proliferate by the particular set of countries might reduce the number of proliferation decisions by more than 75 percent, aborting the projection.

**This table lists two sets of critical countries for each projection. The latter assumes that India's emergence as the sixth nuclear-weapon country is unavoidable.

TABLE 10

| Most Critical Potential Nth Countries* |
|---|
| Argentina |
| Brazil |
| India |
| Iran |
| Israel |
| Japan |
| Libya |
| West Germany |
| Pakistan |
| South Korea |
| Taiwan |

*Based upon the preceding analyses, two groups of critical countries are identified. The first group is made up of those countries that are likely to have a determining impact upon proliferation given the assumptions about sequences and dynamics within the preceding set of projections. The second comprises an additional group of countries that could become critically important were those assumptions to be slightly varied. However, such slight variation would not be likely to result in any of the countries within the former group being dropped from that group.

TABLE 11

Hostile Pairs

| Countries | Earliest Projected Possible Date of Both with Nuclear Weapons* |
|---|---|
| Egypt-Israel | Early 1980s |
| Egypt-Libya | Early 1980s |
| India-Pakistan | Early 1980s |
| Israel-Libya | Early 1980s |
| Taiwan-CPR | Early 1980s |
| Argentina-Brazil | Mid-1980s |
| India-Iran | Mid-1980s |
| Iran-Iraq | Mid-1980s |
| Iran-Saudi Arabia | Mid-1980s |
| Iran-Soviet Union | Mid-1980s |
| Israel-Iraq | Mid-1980s |
| Yugoslavia-Soviet Union | Mid-1980s |
| Japan-CPR | Mid- to Late 1980s |
| Japan-Soviet Union | Mid- to Late 1980s |
| Iraq-Syria | Late 1980s |
| Israel-Syria | Late 1980s |
| South Korea-North Korea | Late 1980s |
| West Germany-Soviet Union | Late 1980s |
| Algeria-Libya | Early 1990s |
| Greece-Turkey | Early 1990s |
| Indonesia-Australia | Early 1990s |
| Philippines-Indonesia | Early 1990s |
| Turkey-Soviet Union | Early 1990s |
| South Africa-Zaire | Mid-1990s |
| South Africa-Nigeria | Mid-1990s |

*Based upon the projections of Section II.

TABLE 12

Proliferation Turning-Points

1. Proliferation decisions by critical countries (see Tables 5-9)
2. Sale or gift of a nuclear weapon
3. Use of nuclear weapon(s)
4. First withdrawal from NPT
5. Emergence of a nuclear-exports "grey market"
6. Widespread dissemination of new enrichment technologies
7. Sharp reduction of American alliance credibility
8. Breakdown of NPT system
9. Unsuccessful or ineffective application of sanctions following safeguards-agreement violation

# III. Parameters of Nth Country Nuclear-Weapon Programs and Postures

Working within the framework provided by the preceding set of alternative proliferation projections, this section undertakes a more detailed characterization of the parameters of Nth country nuclear-weapon programs and postures.* It concludes by delineating critical aspects of Nth country strategic situations. Depending upon those parameters and the resulting patterns of proliferation, the problems and risks of living in a world of many more nuclear-weapon states would vary significantly. Building upon this section, therefore, Section IV identifies, categorizes, and evaluates the problems and risks of a proliferated world.

## Nuclear Explosive Device

### Weapon-Design and Safety

The "fat man" plutonium bomb, detonated by the United States over Nagasaki, weighed 10,000 pounds. Even though the proto-nuclear weapons tested by new nuclear-weapon states are likely to be relatively lighter and less unwieldy than the "fat man" bomb--particularly if extensive prior preparations using existing knowledge are undertaken--these proto- or first generation weapons are in many cases likely to be heavy, unwieldy, and relatively inefficient. Therefore, reducing the size, weight, and dimensions of its first generation weapons would be a first order of business for a new nuclear-weapon country that sought to do more than demonstrate that it, too, could detonate a nuclear explosive device.** Failure to do so would significantly constrain its choice

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*Although citing specific Nth countries as possible examples of cases in which these characteristic features might be evident, this section does not attempt to describe the probable forces and doctrine of each of the 30-35 potential future Nth powers. Any attempt to do so would involve a heavier emphasis upon detailed country-by-country analysis than thought useful; it would also be gravely handicapped by the difficulties of attempting to predict such specific details 10-20 years in advance.

**Some countries--particularly if "going nuclear" becomes a fashion in the late 1980s-early 1990s--could stop here. Cases in point could be Nigeria, Zaire, Indonesia, and Chile.

among modes of delivering the weapon. For example, reliance upon clandestine insertion, suggested as a particularly suitable mode of delivery for a country lacking the capability to develop more sophisticated delivery systems, would probably be handicapped, and perhaps even precluded. Shipborne delivery could be attractive, especially since many potential candidate nuclear-weapon countries have coastal cities. But, reaching an opponent's port in the midst of a crisis could be difficult. In any case, a country might want to have more than a crude counter-city force. In turn, although many candidate nuclear-weapon states have purchased "nuclear-capable" aircraft from the United States or the Soviet Union, "nuclear-capable" means "capable of delivering a relatively sophisticated weapon."* This is not to suggest that a mode of delivery could not be found for a "Nagasaki-type" weapon. For example, a country could utilize a military cargo plane and slide the bomb and a parachute out the back. However, such modes of delivery, some of which are noted below, are likely to be vulnerable to preemptive attack, vulnerable to air defenses, unable to pose a credible threat, and lacking in prestige value and usability. Thus, to repeat, designing and developing "more advanced" nuclear weapons would be a priority task.

For our present purposes, it should suffice to note the consequences of and likely difficulty involved in two levels of weapon development. These are: A) development of well-packaged fission weapons weighing approximately 1,000 pounds; B) development of highly compact fission weapons weighing approximately 300 pounds. In addition to the greater efficiency and more general usability implied, outcome A would allow the weapon to be delivered by any of the following: current tactical aircraft; unguided rockets; a ground-based cruise missile or ballistic missile, but not by an air-launched cruise missile; a large torpedo; and by a modified high-performance aircraft used as a drone. Most, if not nearly all, future Nth countries should be able to test and begin to stockpile such relatively well-packaged, moderate weight fission weapons within a limited number of years.**

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*For example, an impressive weight-lifter like the F4 PHANTOM carries many individual smaller bombs in the 1,000 or 2,000 lb. range. Modern tactical missiles are generally restricted by just this type of consideration. 10,000 pounds of bombs (F4) is <u>not</u> the same as 1 bomb of 10,000 pounds.

**Low-technology countries might take longer to do so. The emergence of a "grey market" in former physicists and weapon-designers, as well as design information, could speed up the process for all countries.

For an unclassified discussion, see William Van Cleave, "Nuclear Technology and Weapons," in Robert M. Lawrence and Joel

In terms of choosing a delivery system and versatility, outcome B is an order of magnitude better than A. At this level of miniaturization, weapons bought "off the shelf" for tactical purposes, e.g., Western ship-to-ship missiles with HE warheads of this order of weight, become suitable as strategic delivery vehicles. However, only more technologically-sophisticated future Nth countries are likely to be able eventually to produce such weapons.*

These early-generation Nth country weapons might lack adequate safety design features. Thus, the possibility of an accident, which either produced a yield or scattered fissionable material, should not be ruled out. Even with later generation weapons, questions about their safety could arise. Insufficient resources might be devoted to the problem of avoiding a nuclear-weapon accident.** In case of conflict between assuring that the weapon could be utilized when desired and precautions against accident, greater emphasis might be placed upon the former than the latter.

## From Fission to Fusion Weapons

Given both the timing of decisions to "go nuclear" within the proliferation projections of Section II and the greater difficulties of developing fusion weapons than of developing more advanced fission weapons, during the 1975-1995 period nearly all Nth countries are likely to

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Larus (eds.), Nuclear Proliferation Phase II (Lawrence: University of Kansas Press, 1974), pp. 30-68, especially pp. 50-55.

*In 1948, the specification for the new A3D strategic naval attack aircraft demanded the capacity to carry a 10,000 pound weapon. However, the 1951 requirement for the A4D shaved this to 2,000 lbs.; and in June 1953, the F86F-35 fighter was ordered, with the capacity to carry a 1,200 pound, 100 KT bomb. At about the same time, the 280 mm. "atomic cannon," with a 600 pound shell, was anounced. At present, 155 mm. (6.1 inch diameter) atomic rounds, weighing about 130 pounds, exist.

**Current American weapons can be dropped accidentally without producing a nuclear yield and can survive the heat and impact of air crashes. However, achieving this capability required a considerable expenditure of money and thinking in the early to mid-1950s.

be confined to developing and stockpiling fission weapons. Possible exceptions could be Japan, West Germany, and perhaps India.* Thus, throughout most, and perhaps all, of this second phase of proliferation, we are likely to be speaking in nearly all cases of kiloton, not megaton, equivalents of destruction. Several possible consequences of this factor are discussed below.

## Modes of Delivery

### Clandestine Insertion

It has been suggested that some Nth countries might utilize clandestine insertion as a mode of delivery. By secretly placing a nuclear weapon(s) in an opponent's major population centers, it could be possible, so the argument runs, for a low-to-medium technology country to acquire an invulnerable second strike capability, and cheaply. Thus, this mode of delivery conceivably might at least be considered by Pakistan, Egypt, Libya, Argentina, Brazil, and Iran. This raises several issues.

To begin, how difficult would it be to penetrate another country and to hide a nuclear weapon? As just noted, an initial requirement could be acquisition of a relatively compact and transportable weapon (or disassembled weapon-components). Assuming a suitable weapon, the likelihood of successful penetration would vary with the permeability and extent of the target country's borders, the effectiveness of whatever restraints upon and monitoring of internal movement might exist within it, and the effectiveness of one's own agent network. Some countries would clearly be more vulnerable to clandestine insertion than others. Thus, an open society such as the United States, with long, essentially unguarded borders and without tight internal surveillance, could be particularly vulnerable.** So might a large, relatively inefficient authoritarian country such as Brazil. Conversely, the possibility of

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*Whether or not even these countries would be able to develop fusion weapons within the time-frame in question would depend upon when they began their nuclear-weapon program and the difficulties encountered. "Grey-market" assistance would again speed-up the process.

**The difficulties in preventing the smuggling of ton-loads of marijuana by World War II light-bombers and by light-planes into the southern United States are usefully recalled.

successful South Korean penetration of North Korea, or perhaps Nth country penetration of the Soviet Union, would appear more remote. More importantly, many countries are likely in any case to lack the experience and ability in "running agents" necessary for clandestine insertion. One exception would be Israel. But alternative modes of delivery are likely to appear more attractive to Israel.

Moreover, utilizing clandestinely inserted weapons for deterrence would require announcing that nuclear weapons had been hidden in the opponent's cities. It might even be useful to reveal the location of one weapon in order to demonstrate that others existed. Presumably, the announcement would trigger efforts by the opponent to locate the remaining weapons. By shielding the bomb, it would be possible to hinder those efforts and to increase the amount of time needed for detection. Concomitantly, a country might seek to prevent disarming of its clandestine weapons by threatening to detonate them. But, would such a threat be sufficiently credible, particularly when challenged by the counter-threat of destruction of one's own cities? And, how difficult would it be to carry out the threat to detonate upon discovery? To military men, these risks, and especially that of premature discovery, would also be a reason to avoid this mode of delivery.*

Finally, the loss of positive control associated with clandestine insertion not only makes it a potentially destabilizing mode of delivery but also is likely to dissuade many of its potential users from adopting it. Given reliance upon clandestine insertion, there is no insurance that one or more weapons, supposedly destined for the opponent's country, might not be diverted by elements within the military itself as a trump card for a future military coup or civil-military confrontation. In this latter case, the ruling elite might not know until a coup were in progress that one of its nuclear weapons "was missing." Even discounting the problems noted above, this final risk is likely to make clandestine insertion appear too dangerous to those politically unstable, technologically weak developing countries--e.g., Pakistan, Egypt, and Libya--and politically unstable, but more technologically developed countries--e.g., Argentina and Brazil--that might see it as a means to a cheap, second-strike capability.

## "Nuclear-Capable" Aircraft

Both the United States and the Soviet Union have supplied "nuclear-capable" aircraft to potential Nth countries. Although most Soviet-built

*Many of the preceding questions would, of course, not arise were the purpose of clandestine insertion to mount an anonymous attack. As discussed in Section IV, this possibility should not be precluded.

fighters would be hard pressed to carry a nuclear weapon weighing 1,000 pounds over any great distance, potential Nth countries such as Egypt, Indonesia, and Iraq have also received Soviet light-bombers. Among aircraft supplied by the United States, even the very widely distributed F-5 would probably suffice as a delivery vehicle, following initial reduction of the weapon's weight and size and re-wiring to mount a nuclear weapon. Thus, for those low-to-medium technology countries unable to develop an alternative, or for those countries choosing not to do so, readily available aircraft could provide their delivery system.

## The Torpedo

This is an exotic alternative, but one which provides a stand-off missile at low cost. In considering its potential adoption by future Nth countries, it should be recalled that many of the important cities of the Third World--if not the world in general--are seaports. (See Table 13.) Moreover, torpedo technology is well-known and warhead size could be managed. A large, slow maritime-reconnaissance or transport plane could be used to drop a "torpedo" well outside the range of conventional defenses, and presumably the missile would require another hour or so to hit. Counter-measures might include torpedo nets. But these would be expensive, and even if they caused an explosion just outside the harbor, the effect might still be impressive. However, this weapon is sufficiently exotic that it is likely to appeal only to a very few states. Nevertheless, attached to a submarine, such a system could constitute a worldwide strategic system at low cost.

## Drone Aircraft

This is an aircraft in which a bomb is incorporated. It is probably the only way to fit a 5,000 or even a 10,000 pound bomb into an F-4. The airplane could be controlled from a "buddy" plane. This type of alternative was very seriously considered about 1947 as a way of extending the effective range of some American naval strategic attack aircraft. Similarly, in Korea, drone fighters actually were used to attack particularly well-defended targets. Because the technology of target drones is probably well known by now, this mode should not exceed the capabilities of low-to-medium technology Nth countries.

TABLE 13

Major Coastal Cites of Hostile Nth Country Pairs

| | |
|---|---|
| Argentina-<br>Brazil | Buenos Aires<br>Recife, Rio de Janeiro |
| Egypt-<br>Israel | Alexandria<br>Haifa, Tel Aviv |
| Egypt-<br>Libya | Alexandria<br>Benghazi, Tripoli |
| Greece-<br>Turkey | Athens<br>Istanbul |
| India-<br>Pakistan | Bombay, Calcutta, Madras<br>Karachi |
| India-<br>Iran | Bombay, Calcutta, Madras |
| Indonesia-<br>Philippines | Djakarta, Surabaja<br>Manila, Cebu |
| Iran-<br>Iraq | Basra |
| Iran-<br>Saudi Arabia | Jidda |
| Iraq-<br>Syria | Basra |
| Israel-<br>Iraq | Haifa, Tel Aviv<br>Basra |
| Israel-<br>Libya | Haifa, Tel Aviv<br>Benghazi, Tripoli |
| Israel-<br>Syria | Haifa, Tel Aviv |
| Japan-<br>CPR | Osaka, Tokyo, Yokohama<br>Dairen, Shanghai |

TABLE 13 (cont'd)

| | |
|---|---|
| Japan-<br>Soviet Union (Eastern) | Osaka, Tokyo, Yokohama<br>Vladivostok |
| Libya-<br>Algeria | Benghazi, Tripoli<br>Algiers, Oran |
| South Africa-<br>Zaire/Nigeria | Cape Town<br>/Lagos |
| South Korea-<br>North Korea | Pusan |
| Taiwan-<br>CPR | Dairen, Shanghai |
| West Germany-<br>Soviet Union (Western) | Odessa |
| Yugoslavia-<br>Soviet Union (Western) | Odessa |

Unguided Rockets

Several potential Nth countries, e.g., Egypt, Iraq, Italy, and Turkey, have been supplied with either Soviet (SCUD, FROG) or American (HONEST JOHN) unguided rockets. These are low sophistication, relatively inaccurate rockets capable of carrying a 2,000 pound warhead a distance of more than 30 miles. Moreover, because such rockets are easy to design and build, to do so indigenously should not exceed the capabilities of medium technology countries. Their low accuracy, however, could be an important drawback, particularly for low-yield warheads and for countries seeking more than a gross counter-city force.

Cruise Missiles

At first glance, this appears to involve fresh technology and, therefore, considerable cost. Development of guidance systems would be a key problem. But, it should also be observed that cruise missile technology need not be particularly subtle. The German V-1 cruise missile, developed in 1943, was a very crude weapon. It managed, though, to place a large number of warheads on target. Moreover, much could be learned from analyzing commercially available aircraft guidance platforms. Thus, cruise missiles may not exceed the capabilities of such medium technology potential Nth countries as Argentina, Brazil, Israel, Iran, and Taiwan. The main caveat is that adapting even well-known technologies often causes great problems for developing nations: note the Indian experience with the design and production of the HF-24 "Marut" fighter.

Setting aside the possibility of indigenous development, it should be noted that the Soviets have supplied a number of countries with air-launched cruise missiles. More importantly, these missiles, like many other Soviet weapons, have very large warheads. Such missiles appeared in Egypt and Indonesia, together with their TU-16 carriers, as early as 1961; later a more advanced weapon was supplied to Egypt (KELT). Others may appear in Syria and in Iraq.*

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*With time, a "grey market" could emerge involving trade in "used" missiles and rockets. Selling older weapons, supplied by the industrial countries, could be a way of partly funding new procurement. Triangular trade in which one country re-exported a foreign supplied missiles(s) in exchange for financial or nuclear technology support might also develop. Egypt and Iraq come to mind as possible sellers. Or the major industrial nations themselves might begin to sell advanced cruise missiles.

## Naval Attack Missiles

For new-nuclear weapon countries confronting an opponent with coastal cities and seeking a counter-city threat, e.g., perhaps Argentina vs. Brazil, Egypt vs. Israel, and Iran vs. India, naval attack missiles could provide a stand-off delivery system. Both Western (GABRIEL, EXOCET) and Soviet (STYX, KELT) versions exist and have been sold to potential Nth countries.* Two differences between Soviet and most Western missiles should be noted: (1) Soviet weapons have much heavier warheads, i.e., they could be adopted to strategic use at a more primitive stage of weapon development; but (2) the smaller Western weapons are sea-skimmers and, hence, are far more difficult to stop. However, "harder to stop" is very much a matter of the level of target-nation technology. Moreover, recent Western discontent at the low lethality of small warhead naval weapons may lead to the availability of heavier warhead missiles by the time (1980s) some of these potential Nth countries would be ready to use such systems.

## Ballistic Missiles

Indigenous design and production of short-range ballistic missiles (SRBMs) might not exceed the capabilities of relatively technologically advanced Nth countries. As in the case of cruise missiles, the critical obstacle would be development of a guidance system. Here, too, analysis of commercially available aircraft guidance platforms would be helpful; a readiness to adopt a counter-city targeting doctrine would reduce the required accuracy. Thus, countries such as Spain, South Africa, Brazil, and Argentina might be able to design and develop an equivalent to Israel's JERICHO SRBM--particularly if, as in Israel's case, foreign technological assistance were available.

Similarly, the more technologically advanced potential Nth countries, e.g., Japan, the Federal Republic of Germany, and Italy, might also attempt to design, develop, and produce IRBMs, SLBMs, and perhaps ICBMs. However, for such countries, indigenous development might demand a major effort, straining the limits of their capabilities. It may be recalled that the French missile program ran into technical difficulties in the late 1960s. Moreover, important inputs for that program, e.g., inertial guidance instrumentation, were produced under license from American companies. Without such foreign assistance, future missile

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*STYX and KELT have been sold to Egypt, Iraq, India, and Indonesia. GABRIEL and EXOCET are being sold to Argentina and Brazil respectively. A "grey market" in these weapons could also emerge by the mid-1980s.

development by the countries noted would most likely be slowed as well. Similarly, the Chinese program appears to be running into difficulties.

Depending upon the particular missile, such characteristics as ability to penetrate enemy defenses, payload and warhead size, survivability, reliability, and accuracy would vary. However, as a mode of delivery, missiles have one characteristic, visibility, which could make them particularly attractive for new nuclear-weapon states. Because of that visibility, in some cases greater prestige and perceived threat potential could be associated with missiles as a mode of delivery. However, this point should not be overstressed: possession of a highly vulnerable force of unguided rockets would probably add less to an Nth country's prestige or to its ability to threaten its opponents than a force of high-performance aircraft.

### Timing

One further question concerns how long it would take to acquire or develop the preceding delivery systems. Some systems are already available, e.g., nuclear-capable aircraft, naval attack missiles, and unguided rockets. More advanced versions of these systems are also likely to become available "off the shelf." In addition, a French decision to sell a non-nuclear version of PLUTON, perhaps following an American decision to sell LANCE to Israel, could also make guided rockets more readily available. Alternatively, development of the Jericho SRBM with French help appears to have taken Israel about 5 years. The French experience in regard to its SLBMs and IRBMs suggests that development of such systems could take about 8-10 years for a high technology country.*

## Determinants of Force Size

The purpose of "going nuclear," resource constraints, perceived threats, doctrine, and bureaucratic politics would interact in determining the size of Nth country nuclear forces. Depending upon the specific

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*As elsewhere, emergence of a "grey market" both for the systems themselves and for technological expertise could speed the timing. Once proliferation became extensive and a "grey market" in nuclear exports emerged, it might not be possible to prevent widespread sale of delivery systems. And, as noted, such sale could occur before that point, building upon existing practices.

country, one or another combination of these factors would be most influential. As a tentative hypothesis, however, it may be suggested that, taken together, they may well lead many Nth countries to be satisfied with relatively small forces, e.g., a stockpile of 50 to 75, 30 to 50 kt. warheads and associated types of delivery vehicles.

## Purpose

Purpose(s) would be the initial determinant of force size, understood in terms of both numbers of vehicles and overall magnitude of effort. Thus, the desire to detonate a nuclear explosive device because "everyone was doing it"--which could motivate a late entrant such as Spain--would have one effect; the drive for regional military-political hegemony and/or global prestige and status another--e.g., in the case of Iran.

## Cost

Initially, for nearly all Nth countries, the opportunity costs of "going nuclear" are likely to be more important than the direct financial costs.* Scarce technological resources, engineering capabilities, and trained personnel would have to be shifted to the nuclear-weapon program. However, as the nuclear-weapon program progressed, particularly if it became committed to developing a relatively sophisticated, stable deterrent force to confront a traditional opponent, the burden of financial costs could become an important constraint. For example, both the French and British experiences in deploying independent nuclear forces have revealed the limits set upon even relatively advanced nuclear powers seeking sophisticated capabilities by resource constraints. Comparable problems could arise for India, Iran, Israel, Argentina, and Brazil if they sought to develop more than a limited capability. And, for other countries, including, e.g., Pakistan, South Korea, Taiwan, and Egypt (without Saudi Arabian financing), cost constraints would be felt even in developing a more limited capability.**

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*However, as Table 4 (p. 12) indicated, for a few potential Nth countries limited financial resources could be as important as the costs of these indirect economic trade-offs.

**Foreign assistance could reduce these costs and make possible a more ambitious program.

Interaction with Opponent

New nuclear-weapon states are also likely to shape their nuclear-weapon program within the framework of traditional perceptions of their relationship(s) of major tension. That is, there is no reason not to expect that their decisions, to the extent that the purpose was not simply "to have a few bombs," would be grounded upon military planners' analysis of who "the enemy" would be and what his capabilities might be. And, depending upon the perceived threat to one's own society, nuclear force, and foreign policy objectives, the size of force perceived to be required would vary. To illustrate, continued movement by the People's Republic of China away from the idea of militarily re-uniting Taiwan with the mainland would influence Taiwanese perceptions of how much of a threat was needed for deterrence. Similarly, the size of a Brazilian force deployed in response to Argentina would depend upon the magnitude of the Argentinian program.

Doctrine

Choice of doctrine would also be an important influence upon force size. Adherence to proportional deterrence doctrine, with its contention that ability to deter is relatively insensitive to disparities of force size, would have a quite different impact upon force size decisions than would adherence to a doctrine of strategic superiority. Thus, another important reason for tentatively suggesting that some, and perhaps many, Nth country nuclear forces would be relatively small has to do with the influence of proportional deterrence and comparable doctrines within many of these countries.

Bureaucratic Politics

Finally, bureaucratic politics, especially inter-service rivalries, could significantly influence Nth country nuclear-force procurement decisions. Many candidate nuclear-weapon countries, e.g., Argentina, Brazil, Turkey, Pakistan, South Korea, and Italy, to name some, are characterized by political instability, weak civilian control over the military, and low military professionalism and high factionalism. In these countries, intra-military rivalry could be a powerful factor in expanding the size of the nuclear force, overshadowing even inter-service rivalries within the United States. Moreover, remembering past intra-military conflict over political issues, and perhaps former military coups, each service might seek access to a component of the nuclear force.

## Controlling Against Unauthorized or Unintended Use

Command and control involves both positive and negative control over a nuclear force: positive control to ensure that the force would be ready and able to go when needed; negative control to ensure that it would not go when not ordered to do so. For several reasons, new nuclear-weapon states are likely to understand the need for controlling against unauthorized and unintended use. To repeat, political instability and military involvement in political life are likely to remain the norm within many new nuclear-weapon states. To the leaders of these countries--e.g., Argentina, Brazil, South Korea, Pakistan, Libya, Iran, Egypt, Spain, and Italy--controlling against unauthorized seizure or use of nuclear weapons by domestic groups and military factions might well be more important than insuring that the nuclear force would be ready and able to go when needed. In addition, even in those countries in which political instability and military involvement in politics are not the norm, strong pressures to assure against unauthorized or unintended use are likely to exist. Unintended use could bring nuclear retaliation by the "erroneous" target. Moreover, such use could use up a significant portion of its nuclear arsenal. And, fears of an attempt by a third party to trigger a catalytic exchange between it and its major opponent, e.g., Libyan attempts to trigger an Israeli-Egyptian exchange, would also, when present, foster efforts by an Nth country to control its nuclear forces.

Various control measures could be adopted: centralized, off-site storage of disassembled warheads, surrounded by special troops;* centralized, off-site storage of assembled but unarmed warheads, again with special guards; on-site storage of warheads, but under special guard, and with provisions for mating and arming by separate commands to military and civilian representatives; unmated weapons, special guards, arming by centrally issued electronic signal; and mated weapons armed by electronic signal.

Depending upon the method of insuring control adopted, the degree of difficulty involved in launching the nuclear force would vary. So would the time needed to do so. Moreover, in the case of several of the

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*An even more extreme variant would store the disassembled components at different locations.

preceding methods, vulnerability to preemptive attack would increase. For example, centralized, off-site storage would allow an opponent to concentrate his attack upon the storage sites. The possibility of unconventional attack upon the storage sites, e.g., a commando raid or a conventional attack using PGMs, also exists. Even assuming on-site storage closely adjacent to delivery vehicles, sufficient time to mate-up most warheads and delivery vehicles might not be available.

Even so, most Nth countries are still likely to prefer erring in the direction of more rather than less control. However, were a politically unstable Nth country, lacking PAL technology, to confront a traditional opponent for whom the possibility of unauthorized seizure did not arise, e.g., Pakistan vs. India or Egypt vs. Israel, or one that had developed more sophisticated PAL technologies, e.g., Iraq vs. Iran or Nigeria vs. South Africa, it might not be possible to follow that preference for tight controls.* That is, by emphasizing tight control at the expense of operational readiness, it might provide its opponent with an important advantage. Much would depend upon the former country's evaluation of its opponent's readiness to use force.

What about a situation involving two new nuclear-weapon states, e.g., Argentina vs. Brazil or Turkey vs. Greece, each of which feared unauthorized internal use? In a crisis, measures by either side to reduce launch time, e.g., by mating-up warheads and vehicles or by moving warheads from storage sites to launch sites, could be especially destabilizing. A failure by the second country to do likewise would increase its vulnerability, perhaps to the point of providing its opponent with a sizeable first-strike bonus. Alternately, a matching response would lead to a mobilization race, characterized by pressure upon the country that mobilized first to use its force while the opponent was still mobilizing. Moreover, assuming successful mobilization by both sides, moving back from alert status to the steady-state mode would be difficult. Without comparable rates of demobilization, each side would fear that its forces would become temporarily vulnerable.

## Limited Intelligence/Information Gathering Capability

Many, if not most, new nuclear-weapon states are likely to possess only limited capabilities for gathering intelligence and information

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*In turn, that would influence our estimates of the likelihood of a nuclear-weapon accident, of unauthorized use, and of inadvertent war.

regarding the opponent's force, his targets, the extent and effects of an opponent's attack, and the results of initial retaliation. This lack would influence pre-war, intra-war, and postwar interaction between opposing Nth countries.

First, limited information could intensify those regional arms races in which each side's decisions were highly sensitive to estimates of the opponent's capabilities, e.g., Egypt and Israel, India and Pakistan, and eventually nuclear arms races between Argentina and Brazil, Iran and India, and Turkey and Greece. Confronted by uncertainties about those capabilities, there would be a strong inclination to adopt a "worst-case" approach. In turn, without reliable target-mapping data, particularly with reliance upon missiles as a mode of delivery, new nuclear-weapon states could be more likely to adopt counter-city targeting doctrines. Moreover, lack of adequate tactical information could create strong preemptive pressures in a crisis, depending upon the advantages of striking first.

Second, given only a limited capability for assessing the impact and scope of an opponent's attack, the likelihood that unauthorized or accidental use could lead to full-scale war might increase. For example, without a rudimentary bomb alarm system, the capability to discriminate rapidly between a limited accident, a ragged attack, and a full scale attack would be seriously reduced. Again, depending upon the vulnerability of its own forces, pressures to attack could become very compelling.

Third, without a capability to monitor both an opponent's attack and the results of its own responses, a country would probably find it more difficult to pursue some variant of controlled-response strategy.

## Low System Reliability and Redundancy

Judging from the American experience, development of a highly reliable and redundant command, control, and communication system is an expensive, intellectually and technically demanding problem. But many candidate nuclear-weapon states are low-to-medium technology countries in which production of the weapons themselves and associated delivery systems would strain existing resources. Low system reliability and redundancy may well be the norm.

Were that to be the case, one result would be increased preemptive instability in an intense crisis between Nth countries. Both sides would fear that the opponent by striking first could sever command and

control links, degrading the system and reducing the weight of retaliation. Both would be tempted by the possibility that by striking first they could have that effect upon the opponent. Reciprocal fears of surprise attack would rise, and, each side, knowing what the other side was thinking, would be under increasing pressure to "strike second, first."

A specific low reliability problem, which should be mentioned, concerns the possible physical or electronic malfunction of warning systems. Such malfunction occurred, for example, in the initial breaking-in of BMEWS.

## Fail-Safe and Alert Procedures

One, admittedly extreme, means of reducing the impact of a command, control, and communication failure would be adoption of a "fail-deadly" mode of operation. For example, as opposed to requiring a positive signal to proceed on to target after launch-on-warning, airplanes might be permitted to continue until a negative recall signal were received. The risk of unauthorized action would be increased, as would the danger of accidental or inadvertent war due to equipment malfunction. But the likelihood that an opponent could preclude retaliation by striking command, control, and communication links would be greatly reduced.

Nonetheless, most Nth countries can be expected to attempt to develop fail-safe procedures. Not only would such procedures and their associated PAL technologies reduce the likelihood of accidental war, they would also facilitate internal control of the force. And, as noted above, protection against unauthorized seizure or use is likely to be one of the highest priority tasks for most Nth countries.

## Types of Protection Against Surprise Attack

A continuing cause for concern has been the possibility that the technical characteristics of new nuclear forces would be destabilizing. The risk of accidental detonation of a nuclear weapon has already been noted, as have potential command and control inadequacies. The following discussion examines the types of protection of Nth country stratetic forces against an opponent's first strike.

Although often cited as a probable Nth country tactic, launch-on-warning (LOW) may well appear too politically unreliable for some countries and/or less reliable than available alternatives for others. Nor, of course, should the possibility that some Nth countries would appreciate the instabilities and risks of reliance upon a LOW, hair-trigger solution to the problem of protection be ruled out.*

On the one hand, as previously noted, many candidate nuclear-weapon countries have a long history of internal instability, military unrest, and domestic political conflict. But, LOW presupposes a willingness to store nuclear weapons close to delivery vehicles in a mode of readiness which could make those weapons tempting targets for military dissidents. Particularly were PAL technology lacking, these new nuclear-weapon states might prefer to maximize protection against unauthorized seizure or use by relying upon central, off-site storage, guarded by special troops. However, as also suggested above, at least some of these politically unstable Nth countries, e.g., Egypt and Pakistan, might have to sacrifice tighter control to operational readiness.

On the other hand, reliance upon alternative types of protection might be possible, even for low-to-medium technology countries. The availability of both fast torpedo boats or submarines which could conceivably carry a nuclear-armed torpedo and fast patrol boats armed with naval cruise missiles would allow countries such as Argentina vs. Brazil, Iran vs. India, India vs. Pakistan, and Pakistan vs. India to rely upon mobility and dispersal to protect at least part of their forces.** In each case, the mode of delivery's suitability depends upon target availability--the opponent has major population centers which could be attacked from the sea--and the availability of sufficiently compact warheads. Alternatively, mobile guided rockets or missiles of one of another type discussed above could be within reach of medium-to-high technology countries, such as India, Israel, West Germany, and perhaps Argentina, Brazil, and Iran. Mobility in the form of either SLBMs or submarine launched cruise missiles might also be an option available to high technology countries. Thus a Japanese POLARIS-type force is not out of the question. Nor should the

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*The problem, however, is not likely to be one of purposeful recklessness, as much as one of limited capabilities and alternatives.

**Protecting communication, command, and control could be more difficult.

development of hardened aircraft shelters and missile silos be precluded. Even though the increasing missile accuracies of superpower forces would negate the effectiveness of this alternative vis-a-vis superpowers, a high degree of protection might be realized against a less sophisticated regional opponent.

One further point concerning how future Nth countries might attempt to protect their strategic forces from surprise attack is in order. Some countries are likely to pay little attention to the problem.

First, as the previous section's projections indicated, some countries, e.g., Spain, Italy, and Chile, can be expected to decide, assuming they do, to develop nuclear weapons only because of proliferation momentum and status considerations. Such countries might be satisfied with having the facade of a nuclear force. If so, little attention might be paid to ensuring that force's usability and its survivability. In its most extreme version, the purpose would be simply to detonate a nuclear device and build-up a small stockpile to show that "we, too, are in the nuclear-weapon business."

Second, limited, if not non-existent, fear of being attacked could also lead some Nth countries to pay only perfunctory attention to protection. A South Africa, which was the only nuclear power in Africa, could take that attitude.

Third, those countries that chose to develop battlefield nuclear weapons or atomic demolition mines, e.g., Taiwan, Sweden, and Switzerland, would, by definition, lack strategic forces to protect. Attention would have to be paid, of course, to protecting the stockpiles of these battlefield weapons.*

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*For a discussion of possible first-strike vulnerabilities within strategic situations involving hostile pairs of Nth countries, see below, pp. 106-108.

"General Good Thing"

Development of nuclear weapons need not be accompanied by the articulation of a well thought-out doctrine. Rather, simple possession of a very small (5-10) stockpile of nuclear weapons might be regarded generally as a good thing, providing diffuse benefits. Among the latter could be included uncertainty on the opponent's part, increased self-assurance in bargaining with other nations, greater international status, creation of a "can-do mentality" within the scientific-industrial-bureaucratic establishment; strengthening public support and lessened domestic opposition, security insurance, and so on. Sophisticated or even moderately thoughtful consideration of the problems of developing a stable, reliable second-strike capability would be lacking; little attention would have been given to how a nuclear-weapon capability would provide the putative benefits postulated by its advocates.

The possible emergence of new nuclear-weapon states in which nuclear weapons would be regarded as"general good things"should not be discounted. A powerful motivation behind the British decision to develop nuclear weapons was the simple belief that to be a self-respecting and respected great power detonation of an atomic bomb was necessary. Thinking about the conditions of deterrence and the difficulties of delivery lagged behind the technical effort of detonating a nuclear weapon. Moreover, much of the advocacy of a nuclear-weapon program in countries such as Argentina, Brazil, Italy, and to some extent India has been couched in terms stressing the diffuse benefits of nuclear weapons. Finally, were possession of nuclear weapons to come to be perceived as a necessary adjunct of nationhood similar to the possession of a national airline earlier, many of the ensuing new proliferators, e.g., Spain, Nigeria, Venezuela, Turkey, and Indonesia, among others, could be expected initially to take this doctrinal approach.

Conceivably, an unsophisticated "general good thing" approach might not be destabilizing. Thus, were a country, e.g., Spain, to content itself with detonating a nuclear explosive device and beginning a slow build-up of a warhead stockpile under tight internal control, while not attempting to plan for possible military use, there might be little increase in the regional level of risk. More likely than not, however, the "general good thing" approach would be accompanied at least by efforts to develop a militarily-usable force, whether or not there were an intention to actually use that force. And, pressures in that direction, arising out of a concern for security and limited knowledge of the opponent's capabilities and intentions, would grow once there were several new nuclear-weapon states in a

given region, e.g., in Latin America. In this latter case, the "general good thing" doctrine would be destabilizing, adding to the likelihood that the resultant nuclear force would be characterized by one or more of the technical failings discussed earlier.

## Tactical Use of Nuclear Weapons

Several potential Nth countries, e.g., Taiwan, Israel, Iran, Sweden, Switzerland, and Pakistan, are likely to regard a nuclear-weapon capability at least partly as a key to successful tactical defense. Thus, one aspect of a Taiwanese nuclear-weapon program would probably be an emphasis upon the utility of such weapons for defending against a CPR amphibious invasion, hopefully deterring it by the threat of objective denial. Such a tactical nuclear, battlefield focus could be especially attractive to a country confronting an opponent whose conventional forces were superior, e.g., Pakistan vs. India, or to a country in which terrain facilitated reliance upon battlefield nuclear weapons by channeling a force through natural invasion corridors, e.g., South Korea vs. North Korea, Iran vs. Soviet Union, and Israel vs. Egypt.

Moreover, to these potential Nth countries, acquisition of nuclear weapons for battlefield use might be more attractive than purchase of PGMs, the most obvious alternative buttress for conventional defense. PGMs would be subject to a variety of tactical countermeasures; nuclear weapons would not be as vulnerable to such measures. Unlike PGMs, nuclear weapons would not be sensitive to weather conditions which could preclude their use or greatly reduce their effectiveness. From the defender's point of view, nuclear weapons could appear to provide a greater certainty of objective denial. Furthermore, PGMs would lack the bonus value of increased prestige, greater threat potential, and reinforced domestic resolve perceived to accompany entry into the nuclear club. Finally, for deterrence by objective denial, nuclear weapons might appear to an Nth country to hold out a greater likelihood of success.*

Assuming both sides had access to nuclear weapons, would such a doctrine emphasizing battlefield use of nuclear weapons have to be complemented by a doctrine and capability designed to deter strategic retaliation? It might be argued that without a capability to deter a threatened counter-city response to an initial use of tactical nuclear weapons, a country would never choose the latter. But to a country confronting an invasion designed to destroy its independence, that threat might not be

*However, as NATO's difficulties in developing a doctrine for using tactical nuclear weapons indicates, this belief may not necessarily be unchallenged.

sufficiently compelling. Given a choice between the risk of destruction following successful use of tactical nuclear weapons against invasion and destruction by conquest, it is not unreasonable to suggest that the former could very well be the chosen alternative. Moreover, there is no reason to keep a Taiwan or a Pakistan from using its tactical nuclear weapons strategically. However, were the decision taken to develop a specific strategic capability to back-stop the battlefield force, the doctrinal outcome would probably be one of the minimum deterrence variants noted below.

## Deterrence by Uncertainty

Strategic confrontations are inherently uncertain. Among the uncertainties are the willingness of the opposing sides to use force, up to and including the use of nuclear weapons; either side's evaluation of what is at stake; the likely response of third parties, especially allies and superpowers; how well a country's strategic nuclear force would work, were it to be used; and the disputant's evaluation of the potential costs of a nuclear exchange.

A deterrence-by-uncertainty doctrine would rely upon these and similar uncertainties, and deliberately manipulate that reliance, in order to deter either conventional or nuclear attack. Quantitative objectives defining how much damage would have to be inflicted upon an opponent to deter him would not be set. Nor would adoption of this doctrine necessarily involve paying serious attention to developing a stable second-strike capability, although it would imply somewhat more attention than would the "general good thing" approach.

A deterrence-by-uncertainty doctrine is likely to be most appealing, although not necessarily effective, to a small power confronting a larger one. Thus, it would be one means by which some, but not most, new nuclear-weapon states seeking to pose a deterrent threat against either superpower might attempt to do so.* For example, one purpose of an eventual Israeli nuclear force might be to increase Soviet uncertainties about the consequences of overt, large-scale military intervention in a future Middle East war. Similarly, even an Iranian nuclear posture primarily directed at the Persian Gulf and India is likely to be back-stopped by an attempt to manipulate Soviet uncertainties, perhaps by threatening Baku. This is also likely to be the Yugoslav posture against the Soviets. A deterrence-by-uncertainty doctrine and posture might also be utilized by an Nth country confronting another, but more technologically advanced and/or

*Those Nth countries confronting a larger power which have the resources to do so are more likely to attempt to develop the proportional deterrence posture discussed next.

powerful, Nth country, e.g., Pakistan vs. India, Argentina vs. Brazil, and Egypt vs. Israel, could be cases in point.*

Among the various deterrent doctrines/postures, deterrence by uncertainty may well be the least credible and least deterring. That would be most evident in a nuclear confrontation involving a less developed Nth country and one of the superpowers. Given the bonus value to the superpower of striking first, the risk of a superpower preemptive strike joined to intra-war deterrence would be high. Moreover, given the probable vulnerability of the Nth country's force to a superpower attack, the most likely outcome would be a disarming first strike. Alternatively, as a threat to deter conventional action by the superpower, e.g., Soviet military intervention in the Sinai, its credibility would be seriously weakened by the superpower counter-threat of devastating counter-retaliation. In a strategic situation involving a smaller, less developed and a larger, more developed Nth country, e.g., Pakistan vs. India or Iraq vs. Iran, comparable factors would operate, but with lesser force. Notwithstanding these limitations, a doctrine of deterrence by uncertainty may well be the only alternative initially open to those new nuclear-weapon states that confront a stronger opponent and lack outside support.

## Proportional Deterrence

Proportional deterrence denies the contention of former Secretary of Defense McNamara that deterrence requires a highly reliable capability to inflict "assured destruction" upon a potential aggressor in a second-strike. Rather, as articulated most fully by Pierre Gallois, this doctrine contends that a small nuclear power, capable of reliably threatening a limited counter-city response, could deter a larger nuclear power. It could do so, the argument continues, because for that larger power the costs of attacking, although "limited," would outweigh the benefits of taking over or destroying the smaller power. That is, deterrence ensues, notwithstanding disparities of threat potential and force size, because the required threat is not inexorably fixed, but is proportional to the value represented by the small or medium country to the larger one.**

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*Although Argentina and Egypt might rely initially upon a deterrence-by-uncertainty posture, both are likely to seek an alternative posture. Either proportional deterrence or assured heavy damage would probably be seen as preferred alternatives. Resource constraints and efforts by their respective opponents to achieve nuclear superiority could, however, undermine their attempt to shift postures.

**In the French debate, this requirement was put in terms of an ability to "arracher un bras."

Proportional deterrence would represent an advance over deterrence by uncertainty, particularly because of its emphasis upon developing a reliable, stable, second-strike force. It is likely to be the preferred deterrence doctrine of India vs. CPR, Pakistan vs. India, Iran vs. Soviet Union, Japan vs. Soviet Union, and West Germany vs. Soviet Union, assuming such a posture does not exceed their available resources.* As a deterrent threat for a small or medium nuclear-weapon state confronting a larger nuclear power, it would be more credible than would deterrence by uncertainty. Nonetheless, given the consequences to the small state of carrying out its threat, a proportional deterrence strategy might provide at most a limited buttress for crisis bargaining and deterrence of lesser provocations. Depending upon the specific scenario, moreover, the pressures upon the larger country to preempt to reduce damage could be great. Yet, for dealing with larger powers, many Nth countries are likely to rely upon proportional deterrence.

## Nuclear Superiority

Within Western strategic studies, nuclear superiority has been variously defined as possession of a disarming first-strike capability, a not incredible first-strike capability, or a significant war-fighting advantage. But to new nuclear-weapon states, such concepts might appear less useful in defining superiority than would a gross comparison of forces. That comparison might be in terms of numbers of warheads and delivery vehicles; "kilotonnage"; or simple qualitative distinctions, e.g., aircraft vs. cruise missiles. More importantly, Nth country strategic thinking might not only utilize "less sophisticated" definitions of superiority, but it might find nuclear superiority and pursuit of a "war-winning" capability a desirable objective. Put simply, "more is better than less" might be the operating premise in many secondary nuclear power strategic situations including, e.g., Israel vs. Arabs, India vs. Pakistan, Iran vs. Iraq, Iran vs. India, Brazil vs. Argentina, and perhaps eventually Japan vs. CPR.

There are several reasons for doubting that the American conventional wisdom's rejection of a quest for superiority would be accepted by the majority of new nuclear-weapon states. To begin, pursuit of superiority may well appear to be a natural objective for a strong country confronting a weaker traditional rival, e.g., India vs. Pakistan, Brazil vs. Argentina, or Israel vs. Egypt. It did so for the United States through the 1950s. Moreover, for those countries whose development of nuclear weapons was motivated primarily by a combination of a drive for

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*In their respective interactions with Israel and Brazil, Egypt and Argentina might also be forced to adopt proportional-deterrence postures.

great power prestige and a pursuit of regional hegemony, e.g., Iran and Brazil, superiority might appear an appropriate objective. Nor is it clear that Nth countries would adhere to the American rejection of damage limitation, particularly since that rejection would clash with traditional military logic. Finally, in the case of countries closely tied to the Soviet Union, e.g. Iraq, Libya, India, and formerly Egypt, thinking about these questions would probably be influenced by Soviet doctrine's emphasis upon a "war-winning" capability. Thus, where resources permitted, the result might be a greater readiness to pursue nuclear superiority--at least initially.

It is not possible to determine a priori whether pursuit of nuclear superiority would be destabilizing. Depending upon the specific regional strategic situation and the actions taken at the time, it might lead to offense-offense arms races, offense-defense arms races, greater risk taking and aggressive behavior, increased risk of accident or accidental war, and dangers of preemption. But, possession of superiority by an Nth country might have a stabilizing effect, much as American strategic superiority provided a stabilizing influence throughout the 1950s and early 1960s. Concomitantly, it is not self-evident that pursuit of superiority would necessarily trigger an ever-expanding arms race. Historical examples in which a weaker opponent was dissuaded from arms racing by the prospect of failure could be cited. Thus, the Franco-British naval race of the 1850s ended with French acceptance of British naval preeminence. Similarly, a strong argument could be made that the trigger to Soviet arms racing in the 1960s was American inaction in preserving the United States' relative superiority.*

## Assured Heavy Damage

This doctrine could be the Nth countries' version of the superpowers' mutual assured destruction doctrine and posture. Given the relatively lesser destructive potential of many future Nth country forces,** such countries may not be able to threaten each other with assured destruction.*** However, in a strategic situation in which two relatively equal countries confronted each other, e.g., Iran and India, Israel and Egypt eventually, and perhaps Argentina and Brazil, each side could attempt to deter a nuclear attack by its opponent by threatening assured heavy damage in retaliation. As in the case of mutual assured destruction doctrine, arbitrary levels of destruction, e.g., 5,000,000

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*For a discussion of varieties of arms racing, see below, pp. 105-106.

**This statement assumes the development by nearly all Nth countries of only fission weapons in the time period being examined.

***An Arab attack upon Israel could be an exception. More generally, for further discussion, see below, Section IV.

fatalities, might be routinely quoted as necessary for deterrence. The main difference between an assured heavy damage posture and a proportional deterrence posture--which claims to do unacceptable damage--is likely to be the level of destruction threatened in retaliation.*

## Defensive Emphasis

The possibility that one or more Nth countries, would adopt a doctrine emphasizing survivability through defense should not be precluded. The resultant posture might combine BMD; air defense; civil defense; city evacuation plans; and a reliable minimum deterrent, second-strike force. Its purpose would be to insure against a nuclear conflict, while reducing the probable effectiveness of nuclear blackmail.

A defensive emphasis doctrine would clearly run counter to the main thrust of current strategic thinking. However, it would not be out of line with several side-currents, e.g., Soviet air defense, civil defense and preparations for city evacuation, Chinese civil-defense measures, and Swedish and Swiss civil-defense measures.

In point of fact, for a country such as Japan, entry into the nuclear club via a defensive emphasis doctrine could be especially attractive. Domestic public opposition might be reduced, while the likelihood of an adverse Chinese response would be held down. Moreover, protection against nuclear blackmail would probably be an especially important motivation behind a Japanese nuclear-weapon capability. Finally, Japan's heavy population-industrial concentration could be an asset, facilitating, as opposed to hindering, defense against nuclear attack.

## Controlled-Response Doctrines

The likelihood that many, if not most, Nth country strategic situations of the time-period in question would involve a confrontation between small forces, whose destruction potential was measured in terms of kiloton not megaton equivalents, should not be overlooked. Conceivably, the initial exchange of nuclear weapons might not be decisive; "broken-back" wars might occur.** Awareness of this possibility could stimulate

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*A variant, perhaps only for confrontations between two comparable low-to-medium technology countries with small forces, e.g., Turkey and Greece, could be the threat of equal destruction. That is, each side might threaten to do as badly to its opponent as had been done to it. However, even among countries with larger nuclear forces, such a doctrine could be found attractive, e.g., to Argentina and Brazil.

**For further discussion of possible characteristics of small Nth country nuclear wars, see Section IV.

interest in controlled-response, central war-fighting doctrines as opposed to doctrines positing an initial destructive spasm. Moreover, unlike the case with the superpowers where the very magnitude of potential destruction made many persons reject out-of-hand the thought of controlled war, the "relatively lesser" levels of destructiveness might make these countries' elites more psychologically willing and able to consider controlled-use doctrines. The paradoxical consequence would be that although limits upon the use of nuclear weapons should deterrence fail are all the more needed at the superpower levels of destructive potential, such limits might be more realizable at lesser levels.

Assuming such a readiness to consider controlled-response doctrines, several doctrines might emerge. The most obvious would be a no-cities doctrine in which each side sought to avoid attacks upon the opponent's cities. A variant would call for prior warning and civilian evacuation before a city were attacked. Another doctrine would envisage tit-for-tat nuclear exchanges, whose purpose would be to inflict commensurate counter-value destruction or to negate whatever military advantage might have been gained by the initial attacker. Such a tit-for-tat doctrine could be explicitly joined to a no-first-use declaration. Alternatively, a doctrine emphasizing tactical use of nuclear weapons only on one's own territory, unless the opponent had first used nuclear weapons on that territory, could be adopted. An emphasis upon an initial exemplary, demonstration attack, designed to create a pause in the conflict, would also fall within the rubric of controlled-response doctrines.

However, the technical characteristics of specific Nth country forces could impede implementation. For example, initial efforts to follow a no-cities doctrine might degenerate into city exchanges because of communication, command, and control inadequacies. Thus, inadequate communication facilities would impede efforts to demonstrate and recognize restraint. Similarly, were command and control weaknesses to include a limited retargeting capability and a rapidly degradable capability for communicating decisions to the force, that could create pressures to go to city attacks before the capability to do so were lost. Alternatively, low reliability alert and fail-safe procedures might lead to accidental or unauthorized attacks upon cities. More generally, Nth country fears about the continued survivability of their forces, magnified perhaps by the small absolute size of those forces, could hinder efforts to engage in controlled exchanges.

## Determinants of Doctrinal Choice

Many of the factors likely to influence the type of doctrine articulated and posture sought by a new nuclear-weapon state have already been mentioned. These factors may be reiterated briefly.

First, choice of doctrine would be influenced by the set of purposes underlying the decision to develop a nuclear force. Thus, detonation of a nuclear explosive device and the build-up of a small stockpile of weapons for prestige purposes is likely to be accompanied by the "general good thing" approach. Alternatively, the doctrine of proportional deterrence was articulated by French strategists attempting to establish the deterrent efficacy of the force de frappe vis-a-vis a larger Soviet force and could appear a useful doctrine to Nth countries in comparable situations.

Nonetheless, although the presence of a specific objective, e.g., deterring a superpower, might lead to a search for a suitable doctrine, doctrine should not be regarded only as post hoc rationalization. Rather, as the preceding discussion of alternative doctrines indicated, particular doctrinal outcomes are likely to influence the type of force acquired. For example, the mutual assured destruction doctrine, while articulated initially by Secretary of Defense McNamara partly as a bureaucratic weapon to draw the line upon procurement of Minuteman missiles, came increasingly to exert independent influence over later American force procurement debates and decisions.

Second, an Nth country's doctrine and posture would also be influenced by its proliferation capabilities. Broadly defined, the latter would encompass the economic and financial resource base needed to support a nuclear-weapon capability. Thus, limited economic and financial resources could force some Nth countries to be satisfied with a deterrence-by-uncertainty posture in dealing with larger powers. Alternatively, the more specific technical characteristics of a country's nuclear force could also shape doctrinal choice. Constraints upon implementation of controlled-response doctrines arising from possible communication, command, and control deficiencies have already been noted. Or, depending upon the available technologies and the resultant offense-defense cost-exchange ratios, a defensive-emphasis doctrine would be more or less persuasive.

Third, doctrinal fashions and trends also exist and would influence new nuclear-weapon states' behavior. In this regard, the potential impact of French reliance upon proportional deterrence doctrine has already been noted. At least initially, therefore, new nuclear-weapon states would be influenced by those doctrinal fashions which were prevalent among the current nuclear-weapon states. With the further spread of nuclear weapons, however, new fashions, geared to the perceived problems of smaller nuclear powers, are likely to emerge. One especially destabilizing possibility should be mentioned and will be discussed fully in Section IV: erosion of the nuclear taboo and the conventionalization of nuclear weapons following successful use of nuclear weapons by an Nth country or superpower.

Fourth, an Nth country's doctrine and posture would also be partially determined by interaction with its major opponent(s). For example, confronted by a weaker opponent, the pursuit of nuclear superiority might be an attractive objective. Or, were neither side to concentrate upon developing a militarily significant nuclear force, both might be content with the "general good thing" approach.

Fifth, domestic institutional and political factors would also help shape the characteristics of Nth country nuclear-weapon doctrine. As already noted, the teaching within a country's military service schools and institutions might orient its military towards one or another doctrine, as might training in another country's service academies. Similarly, the career experiences of military officers could include factors which would greatly influence their later views--e.g., the pro-United States sentiment and strong anti-communism within one segment of the Brazilian military elite of the 1960s had its roots partly in shared service alongside American troops in Italy during World War II. Domestic political calculations could also enter into doctrinal debates in various ways. A given doctrine, e.g., assured destruction in the American context, might be a particularly useful instrument of bureaucratic politics, helping to explain its adoption. Conversely, the eventual doctrine itself could be the resultant of inter-service rivalries and bureaucratic tests of strength. Or, partisan subjects such as bomber gaps, missile gaps, and the necessity of nuclear superiority, might also influence doctrinal outcomes.

Sixth, the pace of future proliferation could have an impact upon the doctrine of new nuclear-weapon states. Thus, a gradual growth in the number of nuclear powers during the first postwar decades allowed for muddling through and the accretion of "nuclear learning." Were rapid, explosive, chain reaction proliferation to characterize the ensuing decades, the time necessary to think through doctrinal alternatives might not be available. Under the pressure of events, the likelihood of destabilizing doctrines being adopted would increase.

## Doctrinal Evolution

The interaction among the preceding set of determinants would also influence the evolution of doctrine within specific Nth countries. If so, is a gradual movement away from potentially destabilizing, relatively unsophisticated doctrine to be expected? The answer is not clear. As argued below, various factors could lead new nuclear-weapon states to conventionalize nuclear weapons. Moreover, judging by American adherence to the mutual assured destruction doctrine, it is not evident that increasing technological sophistication would necessarily be accompanied by the articulation of more sophisticated doctrine.

Rather, the probable direction of doctrinal change remains uncertain. Much is likely to depend upon the influence of critical events, e.g., successful use by an Nth country, accidental war, or superpower adherence to no-first-use declarations, in the initial period of new proliferation.

## Nth Country Strategic Situations

Building upon the preceding examination of the parameters of Nth country nuclear-weapon postures and the proliferation projections of Section II, the following characterizes the types of strategic situations that could occur among Nth countries. It focuses upon three critical aspects of such situations: varieties of arms racing, vulnerability of the respective strategic forces to a first-strike by the opponent, and types of superpower and peripheral Nth country involvement in the core hostile confrontation.

### Varieties of Arms Racing

More often than not, proliferation is likely to be accompanied, at least initially, by increased arms racing among pairs or sets of hostile Nth countries. Bearing in mind the projections of Section II, it is difficult to avoid concluding that the 1980s could see the initiation of fairly intense quantitative and qualitative nuclear arms races in the Middle East, South Asia, and perhaps Latin America. Such arms races are likely to be triggered by regional insecurity, competition for regional status, and traditional hostility. None of the major participants is likely to acquiesce readily to second-class non-nuclear status or to a position of marked nuclear inferiority vis-a-vis its regional opponents. Furthermore, as suggested earlier, limited information concerning that opponent's capabilities and intentions is likely to intensify these initial arms race bursts. Fears, and in some cases the reality, of the opponent's having a first-strike capability are not unlikely. Domestic pressures to keep-up could also be rather strong. Finally, if nuclear weapons were to be used in any region, that would also stimulate arms race efforts.

However, it is necessary to add that in some situations resource availability could be an important constraining factor once such arms racing began. For example, in South Asia and Latin America, both Pakistan and Argentina might quickly find themselves unable to keep-up in a nuclear arms race. Thus, some Nth country arms races might begin, spurt, and then end with the weaker side accepting an inferior position.

Also, relatively limited arms racing could characterize some Nth country strategic situations. For example, both Argentina and Brazil, motivated by status considerations but limited by opportunity costs, might conceivably build up their forces only gradually.* Alternatively, Taiwan might be satisfied with acquiring a small force geared to tactical use and sufficient to reinforce its bargaining position with China. Such a small Taiwanese force might have little impact upon the size and characteristics of a CPR program directed primarily at the Soviet Union and perhaps eventually at Japan. Nor should it be forgotten that as proliferation becomes fashionable, some Nth countries such as Spain, Italy, and perhaps South Africa might not be arms racing with anyone in particular. Each could be going its own way, joining the proliferation trend, but not specifically gearing its program to that of a regional opponent.**

## Vulnerability to a First-Strike

Many discussions of proliferation tend to assume that strategic situations involving two Nth countries would be characterized by reciprocal vulnerability. That is, either side by striking first could markedly reduce, if not eliminate, its opponent's ability to strike back. Some future Nth country situations might be so characterized. Thus, given certain assumptions about each side's posture, reciprocal vulnerability could be one possible outcome of strategic interaction in the mid- to late 1980s between India and Pakistan, Argentina and Brazil, or Greece and Turkey. Consider the following possible postures for each side: a stockpile of 50-100 20-50 kt. warheads; reliance for delivery upon unsheltered, tactical aircraft grouped on a limited number of bases, only partly supplemented by sea-based forces, e.g., naval attack missiles on fast patrol boats; good reliability forces, e.g., 75-80 percent; a limited radar net, warning capability, and long scramble time; vulnerable command, control, and communication joined to a fail-safe, not a fail-deadly, mode of operation; and on-site, unmated storage of warheads for the aircraft. In this situation, a first-strike could conceivably destroy most aircraft on the ground; destroy C3, neutralizing those sea-based forces not destroyed in port and the surviving

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*Given their past antagonism, limited information, and concern for security, this outcome appears less likely than the ones cited above. It could, however, occur.

**For a further indication of which strategic situations might be characterized by more intense arms racing, see Table 15, Section IV.

planes;* and destroy much of the opponent's warhead stockpile. Such a strike might be a viable option for either side. However, before concluding that reciprocal vulnerability would be the standard case among Nth countries, several alternatives should be noted.

One alternative would be reciprocal survivability. In this strategic situation, each secondary power would be highly vulnerable to a preemptive strike by a superpower, but would be itself unable to mount a successful preemptive attack against its major opponent. Reciprocal survivability could arise were two regional opponents, perhaps Argentina and Brazil or Turkey and Greece, to deploy rudimentary, small, low reliability forces, perhaps for prestige reasons. Both would possess a weak second-strike capability by default; neither would expect to alter markedly the outcome of a nuclear exchange by striking first.

Unilateral vulnerability would be a second alternative to reciprocal vulnerability. In this strategic situation, only one of two regional opponents would be able to launch a successful preemptive attack.** Such an attack would allow a country to reduce significantly its expected damage, perhaps even disarming its opponent. A combination of technological and numerical superiority by one country would result in this type of situation. For example, assume Israeli deployment in the early 1980s of 30 nuclear-armed JERICHO missiles in hardened silos.*** Egypt's initial response is to deploy a limited number of aircraft and unguided missiles with nuclear warheads.**** In this situation, the Israelis might well have a first-strike capability. Alternatively, assuming a small-to-medium (50-100 warheads) Indian nuclear force, relying for delivery upon MRBMs such as India may attempt to develop, that force might be able to mount a successful preemptive attack against a smaller Pakistani force, composed of nuclear-capable aircraft and with vulnerable command, control, and communication. Unilateral vulnerability could also

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*Moreover, remaining sea-based forces could be defended against, reducing the weight of a possible, eventual retaliatory blow if the "go" order ever arrived.

**In the extreme variant of unilateral vulnerability, only one side has nuclear weapons, e.g., South Africa vs. Black Africa, South Korea vs. North Korea, Iran vs. Persian Gulf countries, and perhaps initially Israel vs. Egypt.

***This assumes, of course, more fissionable material than Israel might be able to acquire by then from the Dimona reactor. New uranium enrichment techniques, if successfully developed by Israel, could supply that deficiency.

****Egypt is likely to be seriously constrained by its limited capabilities; thus, the assumed disparity of postures.

characterize interaction between some smaller Nth powers and the superpowers, including perhaps India vs. China, Iran vs. Soviet Union, and Israel vs. Soviet Union. Whether such superiority was destabilizing or not would depend heavily upon the objectives of its possessor and upon the willingness of stronger allies to stand behind the weaker power.

Mutual relative survivability would be a third alternative. In this case, neither side would be able to launch a successful preemptive strike, but each would be able to degrade its opponent's warfighting and counter-city capability by striking first. Thus, although there would be a possible advantage in striking first, it would be far less in the reciprocal vulnerability case. For example, were Argentina and Brazil or India and Pakistan each to develop a small-to-medium nuclear force composed of aircraft, dispersed to many bases and sheltered in hardened hangarettes, and a limited sea-based force, both with less vulnerable command, control, and communication, this outcome could emerge. It is likely, in any case, to characterize strategic interaction between Japan and the CPR, Iran and India, and perhaps eventually Israel and Egypt.

Finally, the possibility that both sides would have highly-protected forces should not be ruled out. Mutual invulnerability could characterize, for example, a Soviet Union-Japan interaction, assuming Japanese SLBMs.

Thus, depending upon the particular countries, the stage of their nuclear-weapon programs, and various choices they have made, different strategic balances could result. These include: reciprocal vulnerability, reciprocal survivability, unilateral vulnerability, mutual relative survivability, or mutual invulnerability.*

## Patterns and Types of Superpower, Medium Nuclear-Power, and Nth Country Involvement**

At least initially, most future Nth country strategic situations are likely to be characterized by superpower involvement. Three possible patterns of such involvement should be distinguished. First, one

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*See below Table 16, Section IV for additional characterization of specific strategic situations in terms of first-strike vulnerabilities.

**Possible patterns of involvement are summarized in Table 14, pp.111-113.

superpower might be tied to both sides of a hostile nuclear confrontation. For example, the United States is currently linked to both Iran and Saudi Arabia, while the Soviet Union has ties to both Egypt and Libya. Second, the respective superpowers might be involved on opposing sides of such a confrontation, e.g., between Iran and Iraq, Israel and Egypt, or Pakistan and India. Finally, only one superpower might be involved, but in this case on only one side of an Nth country dispute. In a possible eventual nuclear confrontation between either Japan or Taiwan and the CPR, for example, the United States still might be tied to both of the former countries.

In addition, varying intensities of superpower involvement are likely to exist. Depending upon the specific situation, the respective superpower might be an ally, a reluctant guarantor, a supporter, a powerful patron, or an aspiring suitor. Cases in point would include the relationships between the United States and South Korea (ally), the United States and Israel (reluctant guarantor), the Soviet Union and India (supporter), the Soviet Union and Iraq (powerful patron), and the Soviet Union and Libya (aspiring suitor).

Such initial superpower involvement might, however, give way to efforts to decouple soon after a potential Nth country decided to "go nuclear." For example, pressures upon the United States to decouple would mount following the emergence of Taiwan, South Korea, or Israel as nuclear-weapon countries. Alternatively, if such disengagement did not occur, efforts might be made to coordinate military and political postures with the Nth country, e.g., between the United States and Japan or the United States and West Germany. In any case, whether or not to attempt to decouple and, barring that how to circumscribe the risks of reluctant entanglement, are likely to be critical issues for both superpowers in most Nth country strategic locations.

In addition to superpower involvement, many of these new strategic situations are likely to entail involvement in the core confrontation by allied or interested peripheral Nth countries or by medium nuclear powers. For example, the core confrontation between a nuclear-armed India and a nuclear-armed Pakistan is also likely to draw in China and Iran as well as the superpowers. Similarly, within the Middle East, the core confrontation between Israel and Egypt is likely to be entangled with the confrontation between Libya and Egypt, Israel and Syria, Syria and Iraq, and Israel and Saudi Arabia. Differing intensities of involvement, comparable to those with the superpowers, are also likely to be evident.

Thus, as more Nth countries emerge, the resultant patterns of strategic involvement are likely to be variegated and complex. More importantly,

the presence of outsiders or their absence is likely to influence significantly the characteristics of the core confrontation. For instance, in some cases superpower support for a weaker regional nuclear power could provide a critical stabilizing factor in a local dispute, compensating for that weaker power's possible vulnerability to a first-strike. Alternatively, as discussed below, outside support to non-nuclear powers within a given region could be essential to avoiding nuclear blackmail and "local Munichs."

What stands out from this section's discussion is the growing complexity of a proliferated world. In that world, a broad range of nuclear forces and postures, differing patterns of interaction among Nth countries, and varying patterns of interaction between lesser nuclear-weapon states and the superpowers will all coexist. Section IV identifies, categorizes, and evaluates the likely problems of living in such a world.

TABLE 14

Outside Political Involvement in Potential Nuclear Confrontations*

| Core Confrontation | Projected Earliest Date for Both with Nuclear Weapons | Involved Parties | Intensity of Relationship |
|---|---|---|---|
| Argentina-Brazil | Mid-1980s | United States | Ally |
| | | United States | Ally |
| | | Chile | Ally |
| Egypt-Israel | Early 1980s | Soviet Union | Possible supporter |
| | | Saudi Arabia, Libya, Iraq, and Syria | Allies |
| | | United States | Reluctant guarantor |
| | | Iran (or above) | Interested observer |
| Egypt-Libya | Early 1980s | Soviet Union | Possible supporter |
| | | Saudi Arabia | Ally |
| | | Soviet Union | Aspiring patron |
| Greece-Turkey | Early 1990s | United States | Ally |
| | | United States | Ally |
| India-Pakistan | Early 1980s | Soviet Union | Cautious supporter |
| | | United States | Reluctant semi-ally |
| | | China | Supporter |
| | | Iran | Increasingly interested observer or supporter |
| India-Iran | Mid-1980s | Soviet Union | Cautious supporter |
| | | United States | Limited supporter |
| | | Pakistan | Affected observer |
| Indonesia-Philippines | Early 1990s | Soviet Union | Reinvolved supporter |
| | | United States | Disengaging ally |
| Iran-Iraq | Mid-1980s | United States | Supporter |
| | | Soviet Union | Powerful patron |
| | | Saudi Arabia | Interested observer |

*Derived from TABLE 9, Section II.

TABLE 14 (cont'd)

| Core Confrontation | Projected Earliest Date for Both with Nuclear Weapons | Involved Parties | Intensity of Relationship |
|---|---|---|---|
| Iran-Saudi Arabia | Mid-1980s | United States | Supporter |
| | | United States | Supporter |
| | | Egypt | Ally |
| | | Iraq | Affected observer |
| Iran-Soviet Union | Mid-1980s | United States | Supporter |
| | | Iraq | Affected observer |
| | | India | Affected observer |
| Iraq-Syria | Late 1980s | Soviet Union | Powerful patron |
| | | Remaining Arab countries | Mediating observers |
| | | Soviet Union | Powerful patron |
| | | Remaining Arab countries | Mediating observers |
| Israel-Iraq | Mid-1980s | United States | Reluctant guarantor |
| | | Soviet Union | Powerful patron |
| | | Egypt, Saudi Arabia, Libya, and Syria | Allies |
| | | Iran (or above) | Interested observer |
| Israel-Libya | Early 1980s | United States | Reluctant guarantor |
| | | Soviet Union | Aspiring patron |
| | | Egypt, Saudi Arabia, Iraq, and Syria | Interested observers or allies |
| Israel-Syria | Late 1980s | United States | Reluctant guarantor |
| | | Soviet Union | Powerful patron |
| | | Egypt, Saudi Arabia, Iraq, and Libya | Allies |
| | | Iran (or above) | Interested observer |

TABLE 14 (cont'd)

| Core Confrontation | Projected Earliest Date for Both with Nuclear Weapons | Involved Parties | Intensity of Relationship |
|---|---|---|---|
| Japan-CPR | Mid- to Late 1980s | United States | Ally[1] |
| Japan-Soviet Union | Mid- to Late 1980s | United States | Ally[1] |
| Libya-Algeria | Early 1990s | Soviet Union | Powerful patron |
| | | Soviet Union | Supporter |
| South Africa-Zaire/Nigeria | | --- | --- |
| | | --- | --- |
| South Korea-North Korea | Late 1980s | United States | Ally[1] |
| | | Japan | Affected observer |
| | | Soviet Union | Cautious supporter |
| | | China | Cautious supporter |
| Taiwan-CPR | Early 1980s | United States | Ally[1] |
| | | Japan | Affected observer |
| West Germany-Soviet Union | Late 1980s | United States, France, and Great Britain | Allies[1] |
| | | Warsaw Pact | Allies |
| Yugoslavia-Soviet Union | Mid-1980s | United States | Limited supporter |
| | | Italy and Greece | Affected observers |

[1]Perhaps already beginning to decouple or to reduce extent of involvement.

## IV. Problems and Risks of Proliferation

Building upon the preceding discussion, this section examines the problems and dangers that are likely to emerge if, or perhaps as, proliferation continues. Table 15 lists six categories of possible problems. These involve: 1) use of nuclear weapons; 2) increased global competitiveness and nastiness; 3) intensification of internal political conflict; 4) corrosion of political authority and legitimacy; 5) economic costs; and 6) bizarre events. In discussing each of these categories, this section identifies and briefly illustrates specific problems, indiciates approximately when a problem could begin to emerge, assesses its likelihood, and evaluates its significance.

### Use of Nuclear Weapons

#### Inadvertent or Unintended Nuclear War

In certain future strategic situations characterized by reciprocal vulnerability, an Nth country crisis or low level conflict could erupt into an inadvertent or unintended nuclear exchange. Strong pressures to preempt and spiralling reciprocal fears of surprise attack are likely to be present. Moreover, given those pressures, an accidental or unauthorized launch or a warning-system failure, whether due to mechanical or human causes, could trigger that exchange. The risk of not attacking would outweigh the risk of attacking.

As suggested by Sections II and III, as early as the mid-1980s, Nth country strategic situations characterized by reciprocal vulnerability could emerge, e.g., between Argentina and Brazil, Pakistan and India, and perhaps even between Israel and Egypt.* Concomitantly, particularly during a crisis or the initial stages of a conflict, a command and control failure is not out of the question. Its likelihood would be increased, moreover, if these countries were implementing previously untested or only poorly tested alert procedures.**

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*In the Egypt-Israel case, the emergence of reciprocal vulnerability would require both less progress on Israel's part and more rapid advances on Egypt's part than would appear likely given estimates of their respective technological capabilities.

**As American experience has indicated, developing alert procedures and training people in their implementation is not easy.

TABLE 15

Problems and Risks of Proliferation

A. Use of Nuclear Weapons

1. Inadvertent or unintended nuclear war
2. Catalytic nuclear war
3. Anonymous nuclear attack
4. Terrorist use of nuclear weapons
5. Nuclear blitzkreigs or defense against invasion
6. Calculated nuclear first-strike
7. Preventive nuclear war
8. Conventionalization of nuclear weapons

B. Increased Global Competitiveness and Nastiness

1. Nuclear blackmail and "local Munichs"
2. Threats to "go nuclear"
3. Exacerbation or reinvigoration of old disputes
4. Increased regional arms racing
5. Increased superpower arms racing
6. Superpower confrontations in Nth country disputes
7. Undisciplined dissemination of nuclear weapons

C. Intensification of Internal Political Conflict

1. Nuclear terrorism
2. Nuclear coups d'etat, nuclear civil wars, and nuclear separatist struggles

D. Corrosion of Political Authority and Legitimacy

1. Authoritarian global political shift
2. Loss of governmental legitimacy

E. Economic Costs

1. Budgetary costs
2. Non-budgetary economic costs of adjusting to threat of nuclear terrorism

F. Bizarre Events

1. A new Arcadius
2. The Nutty Pacifist
3. Leopold and Loeb--with physics BAs
4. Nuclear-Luddites

Catalytic Nuclear War

Efforts by one Nth country to provoke a nuclear exchange between two other Nth countries, once again during an intense crisis or limited conflict, might also occur. The most likely region would appear to be the Middle East. Thus, assume that by the late 1980s, as could occur, nuclear weapons have been acquired by Israel, Egypt, Saudi Arabia, Libya, and Iraq. In this situation a more radical Arab state, perhaps Libya or Iraq, might attempt to trigger a nuclear exchange between Israel and the more moderate Arab states. Its purpose could be to prevent a peace settlement with Israel, assuming that political events pointed towards moderate Arabs' acceptance of Israel's right to exist. Given the existence of romantic Arab leaders who envision their destiny to involve destruction of Israel, and who might expect not to be detected, this possibility should not be discounted too heavily.*

Anonymous Nuclear Attack

The possible anonymous use of nuclear weapons also should not be too hastily rejected as inherently implausible. Once again, illustrations are provided by the Middle East. If nuclear weapons spread to the more radical Arab countries--both Libya and Iraq come to mind--a situation in which either might attempt to use nuclear weapons anonymously against Israel could arise. For example, one possibility would envisage an anonymous attack in the midst of serious Arab-Israeli peace negotiations as a way of embittering relations and causing a break in negotiations. If the Israelis were unable to determine who had launched the attack, they might choose to respond by randomly selecting a target within one of the possible perpetrators. Following such response, it is hard to imagine continued negotiations. Any Arab government that sought to make peace would be discredited and probably overthrown from within. Alternatively, an anomymous attack could so strengthen internal Israeli opposition that even if Israel did not respond, the existing Israeli government would have to break off the negotiations.

Alternatively, anonymous use could be directed against the United States, perhaps after American military intervention to seize Arab oil fields following another oil embargo in the late 1980s. This scenario envisages anonymous detonation within an American city of a clandestinely delivered weapon, accompanied by the threat of additional attacks if the United States did not withdraw at once. This would, of course, be a high-risk tactic, given the possibility of detection and retaliation. But, the stakes as perceived by the perpetrator could be sufficient to

*Possible terrorist use in this fashion is discussed below.

lead to its adoption. Moreover, a romantic, revolutionary state like Libya need not be the perpetrator. A more conservative Arab state such as Saudi Arabia might take the chance, relying for anonymity upon the continued general assumption that only Libya would be so "mad" as to consider anonymous use of nuclear weapons.*

## Terrorist Use of Nuclear Weapons

Continued proliferation could also lead to terrorist use of nuclear weapons. The issues involved become clear if we consider possible use against Israel in the 1980s. The potential attacker might be a terrorist group within the PLO or one of the more extreme groups which rejects the PLO as being too "moderate."

The terrorists could obtain a nuclear weapon in several ways. One possibility is that they might be able to construct one themselves. Such a development seems unlikely now. However, if knowledge of nuclear technology became widespread throughout the Arab world, and many skilled Arab technicians were Palestinians, this would not be totally impossible. A more feasible approach might be to steal a bomb. If nuclear weapons are widely deployed in the Middle East, lapses of security could occur. Moreover, soldiers responsible for weapon security in various Middle East countries might be sympathetic to the Palestinian cause. Nor should the possible gift of a bomb to the terrorists by some Arab government be precluded. This could occur if the government wishes to attack Israel, and yet avoid an Israeli reprisal, which could be expected if it were identified as the nation using nuclear weapons.

Given the acquisition of nuclear weapons, why would a terrorist group wish to use them. Several potentially rational objectives should be noted. First, terrorist groups have already staged attacks on a much smaller scale in attempts to derail peace negotiations between Israel and Egypt. If negotiations seem to augur a final peace damaging to Palestinian interests, almost any step might be taken in an attempt to block a settlement.

Second, if Israel makes far wider, much more damaging strikes against the PLO or its 1980s successor, there is likely to be even

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*An even more extreme possibility would entail Soviet anonymous use --following widespread proliferation--to destroy a critical component of American strategic capabilities.

greater desire to inflict severe damage on Israel. A terrorist nuclear bomb would both inflict such damage and warn Israel of the consequences of further Israeli punitive raids.

Third, it also must not be forgotten that there is no one Palestinian group fighting Israel. A large number of groups all compete for funds and public support. It is not inconceivable that one group might conclude that its prestige, support, etc., would increase greatly if it were to explode a nuclear device in Israel.

Fourth, terrorist groups have been known to seize hostages and then threaten their lives unless financial and political demands are met. Whether Israel would be able to continue withstanding terrorist demands if faced with a nuclear threat is far from certain. If, for example, Israel had successfully captured Arafat and was holding him for public trial, his release might be demanded.

Finally, a terrorist organization might hope that the scope of Israeli retaliation would be so great as to cause Israel to lose American political support and perhaps even domestic Israeli support. For example, if Israel were to use its by-then acquired nuclear weapons against Palestinian camps in Lebanon, it is easy to visualize Israel being lectured not to punish all Palestinians, or all Lebanese, for the crimes of some small group. "Responsible" Arab governments would call on the United States to restrain its ally. Strains would no doubt occur in the Israel-United States relationship. If Israel responded with conventional weapons, the strains would not be so great, but still much would depend on the magnitude of the Israeli response. While the Palestinians might also lose some support for using nuclear weapons, the variety of such groups insures that many nations would continue to support the Palestinian cause, denouncing only the particular terrorist group. Although extreme, some such possibilities may well take place in the 1980s.

## Nuclear Blitzkrieg or Defense

The use of nuclear weapons to support or defend against invasion might also occur. As noted in Sections I and II, several potential Nth powers are partially attracted to nuclear weapons by their apparent tactical uses. For example, either India or Pakistan could resort to nuclear weapons during an escalating mid-1980s Indo-Pakistan war. The Pakistanis might utilize a combination of ADM-like ground bursts and attacks against moving formations to stop an Indian army's advance. Conversely, in addition to attacking Pakistani formations, the Indians

could attack Pakistani air bases and storage depots for battlefield nuclear weapons in an attempt to degrade Pakistan's nuclear capability.

Alternatively, asymmetrical use of nuclear weapons by a defending country should not be ruled out. One possibility might be South Korean reliance upon ADMs and battlefield nuclear weapons in the early 1980s to deter or defeat a North Korean invasion. With an expanding South Korean economy in which labor was scarce, making it difficult to maintain a mass army, such substituting of technology for men could become attractive.

## Calculated Nuclear First-Strike

Unlike inadvertent or unintended war in which the pressure of events, perhaps exacerbated by accidental or unauthorized use, leads to a nuclear exchange, in this case one side calculatedly and carefully chooses to launch a nuclear attack. The attacker's purpose is to destroy its opponent's second strike capability and then to enforce its will upon the opponent. Although more difficult to envisage, such nuclear use is not out of the question. One setting might well be a nuclearized Middle East around 1985-1990. In this situation, imagine that following renewed tensions and increased terrorist activities, Egypt blockades Sharm-el-Sheik and mobilizes her forces. The United States refuses to become involved by forcing the blockade, while Israeli naval forces are too weak to do so. Nor is a conventional war in the Sinai attractive to Israel. However, because of her fear of unauthorized seizure or use, Egypt has stored her nuclear weapons in a relatively small number of secret underground locations protected by special troops. She continues to do so even as the crisis heats-up.* The Israelis, having discovered the locations with their effective espionage system, launch a successful disarming attack with nuclear-armed planes and accurate low-yield missiles. The Israelis then renounce any aggressive intentions, demand Egyptian demobilization and a reopening of the approaches to Elath. Even if the Egyptians refuse to concede, Israel's military position is improved by the attack. Though an unlikely chain of events, it could occur.

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*Fear of unauthorized seizure or use would be likely to increase in a crisis and a country might attempt to wait until the very last moment to remove its warheads from storage. Similarly, the desire not to increase preemptive pressures by mating up warheads and vehicles might also lead a country to hold off taking warheads from storage.

## Preventive Nuclear War

Two dangerous points in an arms race are, first, when the inferior power begins to increase its armaments and, second, when it is about to reverse the military balance in its favor. At either point, the stronger power is likely to consider, at least in passing, the desirability of a preventive attack. In future regional arms races, the possibility of preventive nuclear attacks cannot be ruled out. Though unlikely, a Chinese attack against Japanese nuclear-weapon facilities would be possible in the late 1980s. Its purpose would be to prevent Japan's emergence as a nuclear great power due to deep-seated fears of Japan's resurgence.

A preventive nuclear attack against an aspirant nuclear-weapon state by a more advanced regional opponent, however, might be less unlikely. In this case, the attacker would want to preserve its unchallenged position and to avoid costly arms racing and the risk of later conflict. Thus, the risk of a Soviet attack against an incipient West German nuclear force should not be forgotten, particularly if the Soviets had developed highly accurate, low yield missiles. Nor need the attacker be a superpower. In various possible future strategic situations, some Nth countries are likely to have already deployed nuclear weapons by the time their rivals begin to do so. These early-entrants might consider launching a preventive nuclear attack against potentially dangerous late-comers. Iran against Iraq in the late 1980s, South Africa against Nigeria in the mid-1990s, and perhaps Turkey against Greece might be cases in point.

## Small-Power Nuclear Wars

In the preceding discussion of possible Nth country and terrorist uses of nuclear weapons, no consideration has been given to the probable level of fatalities accompanying such use of nuclear weapons. Depending upon the specific use, those consequences would, of course, vary. Thus, the effects of an anonymous attack using a single nuclear weapon would be far less than a counter-city nuclear exchange between two Nth countries. Similarly, the consequences would be less were neither side to adopt an essentially anti-population posture. One means, therefore, of gaining a sense of the possible outer boundary of small Nth country nuclear wars would be to consider the potential fatalities of a possible counter-city exchange between two such countries.

Consider a possible exchange in the mid-1980s between India and Pakistan in which each side: 1) has a stockpile of between 50-100 plutonium bombs of approximately 20 kt.; 2) relies upon aircraft for delivery, of which a sufficient number would survive a first-strike

to permit a 50 bomb response; 3) is willing, however, to use only 30 of its weapons in a retaliatory counter-city strike; and 4) is able, given delivery system unreliability and opposing defenses, to place 80 percent of its bombs on target, i.e., 24 20 kt. bombs. In this case, if the main object of the attack is to kill people and if the bombs do not overlap, each bomb delivered on the larger cities might be estimated to result in 160,000 prompt fatalities. Thus, such a counter-city exchange between India and Pakistan might kill initially upwards of 4 million persons on each side. This figure could rise to 10 million dead over the following month due to untreated burn injuries, radiation effects, fallout, and lack of food, shelter, and health care. Moreover, because a very high percentage of national brainpower and industrial production is centered in these key cities, the loss to national integrity would be quite high.

As noted above, some Nth countries with small nuclear stockpiles might not adopt an anti-population strategy. In that case, the expected level of fatalities would be likely to fall, if only because of the need to use several bombs to be assured of destroying a given target. Moreover, some Nth countries are likely to have smaller nuclear forces than that posited above for India and Pakistan. Therefore, during the periods of time being discussed, 10 million deaths on each side should be taken to approximate the upper boundary of a small Nth country nuclear war.*

In comparison, approximately one million persons were killed during the 1971 Pakistani civil war and the creation of Bangladesh and between 300,000 and 500,000 in 1976 following the abortive Communist coup in Indonesia. As for the Arab-Israeli wars, their death toll has been far less, involving thousands not hundreds of thousands killed. Alternatively, in natural disasters, the 1970 East Pakistan floods killed approximately 300,000 people, the 1970 earthquake in Northern Peru about 67,000, while in 1939 an earthquake destroyed the Turkish city of Erzingan killing 100,000 people.

The fatalities caused by the preceding possible future uses of nuclear weapons by small Nth countries, therefore, could represent in some cases an order of magnitude change from those of certain prior

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*Advent of fusion weapons could, of course, result in one or two orders of magnitude change in expected fatalities. For example, a single 1MT airburst on Karachi might result in 1.7 million immediate fatalities.

small-power wars, domestic upheavals, and natural disasters. Furthermore, possible resort to nuclear weapons by Nth countries should be held to be a significant risk and problem not only because of these potential direct consequences, but also because of possible broader repercussions. On the one hand, as discussed below in many of the possible conflicts in question, the risk of widening involvement, eventually dragging the superpowers into direct confrontation, cannot be dismissed. On the other hand, even only a limited use of nuclear weapons might erode the nuclear taboo, leading to Nth country conventionalization of nuclear weapons. In turn, superpower perceptions of nuclear warfare might be influenced, lowering the nuclear threshold. In fact, given the dangerousness of such a conventionalization of nuclear weapons by Nth countries, it is justifiable to briefly examine that possible problem in greater detail.

## Conventionalization of Nuclear Weapons

During the decades since Nagasaki, and particularly following the decision not to use nuclear weapons in the Korean War, a "nuclear taboo" emerged. Nations came to regard nuclear weapons as special and different, regrettably necessary to deter others' use of nuclear weapons, and of contemplatible utility in only the gravest of contingencies. Although by the 1960s extremely low yield nuclear weapons were becoming available, this deeply engrained, psychological perception of nuclear weapons as not simply more advanced conventional weapons held firm.

However, as additional countries develop them, nuclear weapons might be conventionalized and the nuclear taboo eroded. That is, first Nth countries, and then the superpowers, could come to believe that nuclear weapons <u>were</u> simply more advanced conventional weapons, that they should be used whenever efficiency so dictated, that their purpose extended beyond deterring the use of other nuclear weapons, and that the risk of a nuclear war did not impose a special circumspection upon state behavior.

Various pressures might lead towards Nth country conventionalization of nuclear weapons and erosions of the nuclear taboo:

First, the rising costs of conventional weapon systems could create a "more bang for the cruzeiro" syndrome, particularly were rising domestic resource demands to press heavily upon the absolute level of resources available for defense. An eventual all-nuclear posture could emerge.

Second, ignoring or challenging the preceding casualty estimates, some persons within the new nuclear-weapon states might argue that the presence of nuclear weapons had not undermined the utility of force. A comparable view was not atypical in the United States and Great Britain immediately following 1945.*

Third, changes in the superpowers' defense postures could also influence Nth country perceptions of nuclear weapons. Thus, a shift by NATO towards a mini-nuke emphasis might be likely to increase perceptions of the potential usability of nuclear weapons. Adoption by the United States and the Soviet Union of a controlled response, nuclear options strategic posture could have a comparable effect.

Fourth, alternatively, to the extent that the military in Third World Nth countries is exposed to Soviet doctrine with its emphasis upon integrating nuclear weapons with the general purpose forces, that too is likely to lead toward conventionalizing these weapons.

Fifth, changed nuclear-export policies, leading to the undisciplined dissemination of nuclear materials, could also erode the nuclear taboo. Neither nuclear materials nor nuclear weapons would be looked upon as requiring special handling.

Sixth, the pace of future proliferation would also be important. With rapid, explosive proliferation, the likelihood that each new nuclear-weapon country would assimilate whatever "nuclear learning" that had occurred in the past decades would be reduced.

Seventh, perhaps most importantly, any of the previously-noted uses of nuclear weapons could shatter, or at least gravely weaken, pre-existing psychological perspectives and norms. Such initial use might then lead to a gradual reevaluation of the role of nuclear weapons, reinforced by further use. Eventually, the nuclear taboo could cease to operate as a restraint upon Nth countries, and upon the superpowers as well.

Conversely, however, other factors either exist or might emerge to reinforce the nuclear taboo:

First, as noted above, some countries are likely to be intent upon developing only a small nuclear-weapon capability for prestige or domestic purposes without being concerned about whether or not they acquired a "usable" force.

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*Statements to that effect by both Vannevar Bush and P.M.S. Blackett are easy to find.

Second, as new nuclear-weapon states begin to confront the problems of developing and managing a nuclear force, the difficulties involved should convey the old knowledge that nuclear weapons are not simply more advanced conventional weapons. A similar sobering process could occur once Nth countries began to make serious calculations of the potential damage of a nuclear exchange with their major rival(s): the prospect of 10 million fatalities could be quite persuasive.

Third, moreover, many new nuclear-weapon states would have to be concerned about the role that nuclear weapons might play in a future domestic confrontation or military coup. Not only would the need to assure domestic control be a deterrent against an all-nuclear posture, but awareness of this added dimension could again suggest the uniqueness of nuclear weapons.

Fourth, alternatively, the lesson might be brought home were inadequate safety, command,and control measures to lead, as may not be unlikely, to accidental detonation of a nuclear weapon.

Fifth, adoption by the United States and other existing nuclear-weapon states of a no-first-use doctrine would also reinforce the nuclear taboo. So would the emergence of nuclear-free zones in those remaining regions which had yet to be nuclearized.

Sixth, use of a nuclear weapon might have a powerful opposite demonstration effect. If only between the superpowers, a spate of small nuclear wars and limited uses might reinforce the belief in the need to preserve the nuclear threshold.

It remains to be seen, however, which set of forces would prevail once proliferation became increasingly widespread.

One category of problems or risks involves, thus, the possible use of nuclear weapons. The prospect of such use should be a cause for concern both because of its direct human costs in terms of lives lost and because of its potential indirect consequences, one of which could well be the conventionalization of nuclear weapons and the erosion of the nuclear taboo.*

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*Another, equally important, indirect consequence is discussed below: the corrosion of political authority and legitimacy.

## Increased Global Competitiveness and Nastiness

Proliferation might also lead to increased global competitiveness and nastiness. Even assuming that projections of only limited proliferation are borne out by future events, a perceptible increase could be evident by the mid-1980s.

### Nuclear Blackmail and "Local Munichs"

As noted in Section I, many countries perceive a nuclear-weapon capability as a buttress to their bargaining position. The growing spread of nuclear weapons could be accompanied, therefore, by future "local Munichs." For example, in the late 1980s a nuclear-armed Iran could enforce its version of a fair distribution of offshore oil rights in the Persian Gulf. Alternatively, assuming a situation of strategic asymmetry between India and Pakistan, in the early 1980s India might decide to settle finally the Kashmir question. Or, unexpectedly confronted in the late 1980s by renewed and more effective Black African hostility, South Africa could seek to force a peace by nuclear threats.

However, unsuccessful attempts at nuclear blackmail can also be expected. Thus, assuming that Libya has acquired a nuclear weapon by the early 1980s, Qaddafi might well attempt to enforce his own version of Munich upon Israel. The Palestinians would be expected to play the part of the Sudeten Germans. At this point, assuming that Israel lacked a completed "bomb in the basement," she would begin a crash program to assemble a nuclear weapon, relying on past preparations and stalling for time by negotiating. Israel might also threaten to destroy Arab Holy Places in Jerusalem and Mecca, using PGMs and regular dynamite, if Qaddafi attacked Israel with nuclear weapons. Given the religious beliefs of Arab leaders, this threat could be quite compelling. In any case, Israel is unlikely to play the role of Czechoslovakia.

### Threats to "Go Nuclear"

During the coming decade, efforts by potential Nth countries to manipulate the threat to "go nuclear" could become increasingly widespread. Countries such as South Korea, Taiwan, Pakistan, Spain, and Israel might attempt to trade a decision <u>not</u> to develop (or overtly

deploy?) nuclear weapons for: maintenance of an American troop presence; supplies of advanced conventional weapons, particularly PGMs; diplomatic support, including increased security ties; economic assistance; and/or multi-power security guarantees. Thus, Prime Minister Bhutto's implicit warning that a failure to lift the embargo on arms sales to South Asia might trigger a Pakistani crash program to develop nuclear weapons could be an indication of things to come.

The preceding strategy's attractiveness would depend upon whether manipulating the threat to "go nuclear" would provide greater benefits and entail fewer costs than would actually doing so. That could be the case for some countries. For example, by manipulating the prospect of Israeli nuclear weapons, Israel could seek to assure American support while avoiding the costs of nuclearizing the Middle East conflict--not least of which might be American decoupling from Israel. Alternatively, were Pakistan able to manipulate the threat to "go nuclear" in order to reinvigorate the American commitment to Pakistan's security, doing so might well be more advantageous than developing a nuclear-weapon capability. The latter would divert scarce resources, perhaps trigger an Indian military response, and set off a regional arms race in which Pakistan would probably come off second best to India (or third best, if Iran is included).

## Exacerbation or Reinvigoration of Old Disputes

Even without the use of nuclear weapons, proliferation might exacerbate some international disputes and reinvigorate others. Thus, within the Middle East, proliferation would probably reinforce existing suspicions and fears on both sides of the Arab-Israeli conflict. Domestic Israeli opponents of a peace settlement could point to Egyptian intentions. Conversely, Israeli nuclear weapons could be cited as evidence of Israel's imperialist designs. Elsewhere within the Middle East, the acquisition of nuclear weapons by Libya, Egypt, Iran, and others would be likely to bring to the surface somewhat dormant fears and desires. Within South Asia as well, old disputes could be intensified. Thus, following its possible emergence as the dominant regional nuclear power, India's temptation to assert more forcefully its claim to regional paramountcy could be even more irresistible than it appears to be now. Conversely, Pakistan's sense of lost possibilities and wounded pride may well be heightened once again. Alternatively, within Asia, Japan's emergence as a nuclear-weapon state would be likely to reinvigorate old fears of Japanese domination. Other cases in which proliferation could have the preceding effects, whether by legitimizing and reinforcing existing suspicion, touching raw nerves and amour propre, or bringing to mind past behavior could be illustrated.

However, the possibility that in certain cases proliferation could help calm an existing dispute should not be overlooked. For example, Taiwanese acquisition of a nuclear-weapon capability, both by precluding invasion and by strengthening Taiwanese internal morale and self-confidence, could contribute to a Formosa-Straits detente. No longer hoping for the eventual internal collapse of the Taiwan regime and with forceful reunification precluded, the CPR might move gradually to redefine its position concerning Taiwan's status as a Chinese province.

Finally, in still other cases, proliferation could, but probably would not, lead first to an exacerbation of political relations between two countries and then to a mutually acceptable modus vivendi. Following an unsuccessful Argentinian effort in the mid-1980s to trump superior Brazilian political, economic, and conventional military power by "going nuclear," Argentina might accept finally its second-place role in Latin America. Similarly, a nuclear-armed India would hope that this would be the South Asian outcome. Nevertheless, increased embitterment and hostility may be the more likely result.

## Increased Regional Arms Racing

As discussed in Section III, more often than not, proliferation is likely to be accompanied, at least initially, by increased regional arms racing. In the 1980s, fairly intense quantitative and qualitative nuclear arms races could emerge in the Middle East, South Asia, and perhaps Latin America. However, it is necessary to repeat that in some situations resource availability could be an important constraining factor once such arms racing began. Thus, some Nth country arms races might begin, spurt, and then end with the weaker side accepting an inferior position. South Asia and Latin America again come to mind. Finally, as also proposed above, relatively limited arms racing could characterize some Nth country strategic situations. In this regard, it is important to remember that certain Nth countries, e.g., Spain, Italy, and perhaps South Africa, might not be arms racing with anyone. Each could be going its own way, joining the trend, but not specifically gearing its program to that of a regional opponent.

Assuming then a mixture of arms racing effects, initially at least skewed towards somewhat more intense regional competition, what might be that phenomenon's significance? Without becoming ensnared in the perennial debate about whether arms races lead to war, two points should be made. On the one hand, in those regions already or likely to become arenas of political conflict, e.g., the Middle East, the Persian Gulf, and the Aegean, intensified nuclear arms racing could well exacerbate existing hostility and hinder efforts to achieve a regional modus vivendi. In so doing, it would further increase the risks to the

superpowers of involvement in such regions. On the other hand, nuclear arms racing is likely to involve diversion of scarce technical, economic, and administrative resources. Particularly for those less developed countries likely to be engaged in more intense arms racing, e.g., Egypt, Iran, Argentina, Brazil, Turkey, and Greece, the result may well be increased political instability and a greater likelihood of internal political conflict.

## Increased Superpower Arms Racing

The indirect effects of growing proliferation could include increased superpower arms racing. More specifically, by the mid- to late 1980s, the Soviets could be confronted by German, Japanese, Iranian, and Israeli nuclear forces in addition to those of the United States and China. Two consequences could follow, each of which would probably lead to increased Soviet-American arms racing. First, given a growing Soviet sense of threat, currently dormant Soviet interest in ballistic missile defense might be reawakened. The ABM Treaty might be renegotiated to permit light area defense, perhaps using space-based lasers, or terminated. Pressures upon the United States to follow suit would be likely to grow. Moreover, if space-based lasers were deployed, it could be difficult to regulate their potential growth to a full-scale BMD system. Second, Soviet strategic force requirements would now have to be calculated on the basis of an increased number of possible enemies and targets. Pressures to augment Soviet forces might increase, possibly influencing, in turn, American strategic force requirements.

Assessing the stability of such a new post-1990 strategic balance would require more detailed analysis than is possible. At the very least, however, that change would be likely to increase the economic burden of Soviet-American arms competition.

## Superpower Confrontations Arising from Nth Country Disputes

In Section III the possibility that the superpowers could find themselves involved on opposing sides of a dispute between Nth countries was noted. To reiterate, by the mid-1980s, that pattern of outside involvement could characterize disputes between Israel and assorted Arab states, Pakistan and India, Iran and Iraq, and Iran and India. Inherent in such superpower involvement on opposing sides is the risk of direct Soviet-American confrontation and conflict. Notwithstanding a likely desire on both superpowers' parts to avoid such a clash, it could still occur. For instance, in the Middle East, because of a reluctance to not stand by their respective partners in a crisis and the pressures of events, both might be drawn into such a direct confrontation. And, although

this possibility currently exists, the presence of nuclear weapons on all sides could well increase the level of risk involved.

## Undisciplined Dissemination of Nuclear Weapons

Several types of undisciplined dissemination of nuclear weapons can be distinguished. One would involve a sale or gift to other countries. Alternatively, terrorist organizations might be the purchasers or recipients. Most extremely, such undisciplined dissemination would include the sale of nuclear weapons to wealthy individuals and criminal organizations. From one perspective, the sale or gift of nuclear weapons could be held to be more a source of various problems, e.g., terrorist use, then a problem in itself. However, given the possible dangers and adverse consequences of undisciplined dissemination--whether in terms of its previously noted impact upon the scope and pace of proliferation or of its making nuclear weapons available to all comers for a price--it warrants consideration as a problem in its own right. In point of fact, undisciplined dissemination perhaps best symbolizes the potential nastiness of a proliferated world. Furthermore, the precursors of its most extreme versions could begin to emerge as early as the 1980s.

Proliferation threatens, therefore, to increase global competitiveness and nastiness. In addition to its direct costs, the result may well be a decreased likelihood that necessary new international institutions regulating trade, resources, global monetary affairs, energy, and the environment can be successfully established.

## Intensification of Internal Political Conflict

A third category of possible problems of proliferation involves intensified internal political conflict, not least of all in the many politically unstable potential Nth countries. Two ways in which internal political conflict could be intensified have been noted already. Thus, the possibility that a decision by some countries to develop nuclear weapons could trigger intense domestic political debate embittering the future political climate was noted both in Section I and II. Possible political instability and internal unrest indirectly linked to the economic costs of a nuclear-weapon program has just been suggested. The following, therefore, considers briefly several other ways in which proliferation could involve intensified internal political conflict.

## Nuclear Terrorism

Possible terrorist use or threatened use of nuclear weapons has been partly discussed above. Several additional points, directly related to the problem of internal nuclear terrorism, should be noted. To begin, both the widespread diffusion of nuclear technology and the limited means available for controlling the use of potentially weapon-grade material suggest that one or more nuclear terrorist incidents are not unlikely to occur within the next decades. Successors to such groups as the Japanese Red Army or the Baader-Meinhof Gang could see nuclear terrorism as a suitable means of realizing their stated end of pulling down existing bourgeois society. Alternatively, as suggested earlier, threatened terrorist use as a means of extortion cannot be precluded. Finally, although means of controlling against nuclear terrorism are likely to be developed eventually, some of those controls are also likely to be inconsistent with the purposes and norms of democratic political life.*

## "Nuclear Coups d'Etat," Nuclear Civil Wars, and Nuclear Separatist Struggles

As noted previously, many potential Nth countries are politically unstable, frequently having a long history of military involvement in their domestic politics punctuated by periodic military coups d'etat.** Moreover, several other potential Nth countries confront the prospect of future succession crises which could trigger a military coup.***

Given the preceding, a "nuclear coup d'etat" in one or more of these countries, were they to "go nuclear," could occur. To a dissident military faction, control of all or part of its country's nuclear arsenal could be a valuable asset. Control could increase the bargaining leverage of such a faction; provide it with a means of demonstrating that the "mandate of heaven" had shifted; prevent the use of military force

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*For an elaboration of this point, see the discussion below of a possible authoritarian global political shift.

**To list them once again: Argentina, Brazil, South Korea, Egypt, Turkey, Pakistan, Indonesia, Libya, Greece, and Iraq.

***If the eventual fall from power of the Italian Christian Democratic Party constitutes a succession crisis, which it might after thirty years of CD rule, Italy is included in this group along with Yugoslavia and Spain. So might be Iran, were the Shah to die suddenly.

against it, forcing others to bargain with it; and, though less likely, allow it to destroy key opposing military formations. It is usefully recalled that during the April, 1961 "Revolt of the Generals" in Algiers, de Gaulle ordered a French atom bomb to be fizzled at the Reganne, Algeria test site.*

Whether such nuclear bargaining by the military could exceed internalized and shared rules of the domestic political game in some politically unstable potential Nth countries is an open question. That is, in current, but not early-twentieth century, Latin American politics, actual military use of force in a coup is usually to be avoided. However, in other regions, whatever limits that exist are harder to discern. Military coups grounded in personal discontent, pay grievances, tribal conflict, and out of disagreement with civilian policymakers occur with great regularity. In most cases, therefore, it is hard not to conclude that the presence of nuclear weapons would be a factor, perhaps a decisive one, in future military coups.

Moreover, the very existence of nuclear weapons could change the rules of the game in those countries where such nuclear bargaining could appear at first to be "beyond the pale." All that might be necessary could be for one military to set the example. Thus, a return to the days in Latin America when Congressional torpedo boats attacked a Presidential battleship or battleships steamed into the Rio de Janeiro harbor and shelled the city could occur.

The broader significance of such possible "nuclear coups d'etat" is two-fold. On the one hand, use or threatened use of nuclear weapons, even if only within a country, could erode the nuclear taboo. On the other hand, such a coup might bring into control of nuclear weapons a romantic, unstable leader whose future actions cannot be predicted, but are likely to be destabilizing.

Taken one step further, the possibility of a "nuclear coup d'etat" points to nuclear civil wars and separatist struggles. Thus, an intra-military conflict during an attempted coup might degenerate into a civil war in which nuclear weapons were used. Alternatively, nuclear weapons might be seized by a separatist movement. Moreover, access to nuclear weapons by a separatist movement might markedly improve its chances of success. Intra-nation deterrence might ensue, forcing the central government to come to terms with the separatist region, either by granting it autonomy or by acknowledging its independence. This last point, however, should not be overstressed. If the level of destructiveness threatened by the separatist region is sufficiently small, the central government might pay the price of forcing its return. In any case, as, or if, proliferation encompasses such countries as India, Pakistan, Iran, the Philippines, and Nigeria, such nuclear separatist struggles could

*For elaboration see D. G. Brennan, "The Risks of Spreading Weapons: A Historical Case," Arms Control and Disarmament, I (1968), pp. 59-60.

occur. And, once again, the most important broader impact of such nuclear civil wars or nuclear separatist struggles could be erosion of the nuclear taboo.

## Corrosion of Political Authority and Legitimacy

### Authoritarian Global Political Shift

Proliferation could lead to an authoritarian global political shift, including the erosion of liberal values within the Western democracies. Either or both of two pressures could be at the root of that shift.

On the one hand, controlling against nuclear theft, nuclear terrorism, and anonymous use by the 1980s could require adoption of measures that would be inconsistent with liberal democratic values and procedural norms. For example, within the United States, restrictions over governmental power in such civil liberties areas as search and seizure, arrest and questioning of suspects, wiretapping and more sophisticated surveillance methods, individual privacy, and collection and computer storage of dossiers might be gradually eroded. Similarly, restrictions on movement in and out of the United States and on movement within it could grow.* In both cases, it would be argued that such changes were necessary to prevent nuclear theft and to locate and deal with nuclear terrorists or foreign agents.

On the other hand, the increased insecurity, hostility, and competitiveness that could accompany the emergence of a world of as many as forty nuclear-weapon states by 1995 could also create pressures for an authoritarian political shift. Not only might an increasing level of resources be allocated to defense, but within societies, including the United States, a siege mentality could begin to emerge. That siege mentality would be fed by the growing perception of the world as a much more dangerous and inhospitable place. Particularly in regard to the United States, it is worth recalling that both the Red Scare of 1919-1921 and the McCarthy Movement of the early 1950s were associated with such a perceived hostile shift in the world environment. Even though the origins of the shift would be different, the process would be comparable.

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*For example, private flying might be rigidly controlled, if not vitually banned, in large areas of the United States.

## Loss of Governmental Authority and Legitimacy

If extensive proliferation accompanied by nuclear terrorism, anonymous use of nuclear weapons, and nuclear blackmail occurs, many governments might find it increasingly difficult to ensure national security. One purpose or obligation of government, however, is to provide for the common defense. Failure to do so could lead to a loss of governmental authority and legitimacy. In a proliferated world, therefore, popular opinion might increasingly believe that government was no longer meeting its obligations.

This problem might be more pronounced in industrialized countries than in less developed ones. The population of the former makes heavier demands upon government and is less accustomed to learning to live with man-made or natural disasters. Thus, governmental authority and legitimacy might drop sharply, following terrorist use of nuclear weapons in countries such as the United States and those of Western Europe. But, even among less developed countries, governmental legitimacy among the elite could be eroded by an inability to ensure national security in a nuclear world.

From the American perspective, one of the most important risks of proliferation is that it could involve such a corrosion of political authority and legitimacy within the United States. In a world perceived to be hostile and dangerous, American liberal values and institutions could be eroded in an attempt to protect against that world. Conversely, failure to deal adequately with the possible dangers of a proliferated world could undermine the authority and legitimacy of American institutions. Moreover, both problems might arise. That is, an initial failure, e.g., in dealing with nuclear terrorism, could trigger a pronounced authoritarian political shift.

# Economic Costs

## Budgetary Costs of Managing the Problems of Proliferation

Efforts to manage the problems of proliferation could lead to increased defense spending within the United States and the Soviet Union. The possible triggering of first Soviet and then American deployment of ABM systems has already been noted. And, were it not possible to hold such deployment to light area defense systems, its ultimate costs and those of whatever other arms racing might be triggered might be in the many tens of billions of dollars. Alternatively, within the Western

democracies,* those internal police, intelligence, and surveillance functions likely to be launched to manage the problems of nuclear terrorism and anonymous use would also involve increased budgetary costs. Moreover, in both examples such costs could be evident by the mid- to late 1980s.

## Non-Budgetary Economic Costs of Adjusting to the Threat of Nuclear Terrorism

Adusting to the threat of successful nuclear terrorism could also have non-budgetary economic costs whose dimensions can be only dimly perceived at present.** That is, if nuclear terrorism becomes a serious problem, a free-market-regulated dispersal of industry and population might take place. In addition to the initial economic costs of such relocation, there could be costs in terms of the increased expense of providing a continued level of necessary services within society and of carrying on normal commercial and personal interaction over greater distances. Such a reconstitution of economic and societal patterns frequently is overlooked, however, in considerations of proliferation's potential consequences and costs.

## Bizarre Events

If past experience is a guide, proliferation is also likely to produce bizarre problems which cannot be foreseen in advance, or which, if mentioned, would be rejected out-of-hand. To illustrate this point, the following very briefly notes some possible bizarre events. Others could undoubtedly be added to the list.

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*In contrast to the situation in tightly regulated, closed societies, e.g., the Soviet Union, where such internal control functions already are heavily budgeted.

**As suggested by the earlier discussion of clandestine insertion as a mode of delivery, the threat of successful cases of nuclear terrorism is likely to be far greater within relatively open societies and inefficient authoritarian ones than within closed societies like the Soviet Union.

A New Arcadius

In 400 A.D. Arcadius destroyed the Ancient Greek Temple of Apollo. His purpose was quite simple: "to go down in history as the man who had destroyed the Temple of Apollo." A future romantic in possession of nuclear weapons might use them in some equally spectacular fashion for a similar reason.

The Nutty-Pacifist

A fanatic pacifist with access to nuclear weapons might set one off in an attempt to shock the world to its senses. By doing so, he might reason, the world would finally be made to see the need for nuclear disarmament.

Leopold and Loeb--with Physics BAs

Leopold and Loeb were two sons of wealthy Chicago parents who killed a young boy to see what it was like to kill someone. Their successors, with physics BAs, might build a nuclear weapon using stolen fissionable material and detonate it--to see, perhaps, what New York without the World Trade Center might look like.

Nuclear Luddites

If by the early 1990s technological constraints have eroded, nuclear weapons could be accessible to very poor underdeveloped countries. Moreover, such countries might have only bleak future prospects of development. In this situation, one possibility they might consider would be nuclear blackmail against the developed world. Their aim would be to gain increased access to global wealth. Another, more extreme, possibility would involve anonymous nuclear attack against one or more industrialized countries. The sole purpose of such an attack would be to strike out in frustration and blind rage at the perceived source of torment: the industrial world.

Suffice it to add that none of the preceding appears likely to occur. But some such problems, no less bizarre to the world of 1975, are highly likely to emerge in a future world of many more nuclear-weapons states. These, too, must be recognized in considering the problems and risks of global proliferation.

In conclusion, Table 16 provides a projection of the problems and risks of future proliferation. It tentatively indicates both where critical problems conceivably could emerge and the approximate lead-times for thinking about how to manage them. It is not intended to be, nor could it be, a prediction of future events.

Table 17 then lists those problems which could pose a direct threat to either the United States or the Soviet Union. Such a "direct threat" is defined as involving the risk of: use of nuclear weapons within the central homeland; a Soviet-American confrontation abroad; erosion of core societal political and social values; or high economic costs. Regarding Table 17, the asymmetrical impact of several problems upon the Soviet Union and the United States should be noted. Of particular interest is the likelihood of either country's being directly threatened by an Nth country strategic force--as distinguished from clandestinely inserted weapons. As early as the mid-1980s, the Soviets could find themselves confronting Iranian, Japanese, Israeli, and West German nuclear forces, relying possibly upon aircraft for delivery at first and then upon missiles, in addition to those of the United States, the PRC, France, and U.K. In contrast, it appears unlikely to be until the 1990s, if then, that the United States may confront Nth country opponents with strategic forces able to threaten directly the United States. Although it is somewhat more difficult to identify countries that would seek to target the United States, under certain hypothetical conditions, Iran, Brazil, and perhaps Japan could be cases in point. However, as discussed in Section Three, Brazil and Iran would confront technical difficulties in developing long-range delivery systems to carry out that presumed objective.

# TABLE 16

## Projection of the Problems and Risks of Future Proliferation

| Problem or Risk | Some Possible Situations or Cases | Earliest Projected Date Could Emerge |
|---|---|---|
| **A. Risk of Use of Nuclear Weapons** | | |
| Inadvertent or unintended nuclear war | Argentina-Brazil | Mid-1980s |
| | Pakistan-India | Early 1980s |
| | Israel-Egypt | Early 1980s |
| | Greece-Turkey | Early 1990s |
| Catalytic nuclear war | PLO-triggered Arab-Israel war | Early to Mid-1980s |
| | Libya or Iraq-triggered Egypt-Israel war | Early or Late 1980s |
| Anonymous nuclear attack | By Libya or Iraq against Israel | Early or Late 1980s |
| | By Libya or Saudi Arabia against U.S. | Early to Mid-1980s |
| | By Soviet Union against U.S. | After widespread proliferation |
| Terrorist use | Against Israel by PLO fringe | Mid-1980s |
| | Against Western democracies by "Baader-Meinhof" types | Early to Mid-1980s |
| Nuclear blitzkriegs or defense against invasion | India-Pakistan | Early 1980s |
| | South Korea-North Korea | Mid-1980s |
| | Iran-Soviet Union | Early to Mid-1980s |
| | Taiwan-CPR | Early 1980s |
| Calculated nuclear first-strike | Israel against Egypt | Mid- to Late 1980s |
| | India against Pakistan | Early 1980s |
| | Soviet Union against Iran | Mid-1980s |
| Preventive nuclear war | CPR against Japan | Late 1980s |
| | Iran against Iraq | Late 1980s |
| | Turkey against Greece | Early 1990s |
| | Soviet Union against West Germany | Late 1980s |
| | South Africa against Zaire | Mid-1990s |
| | Soviet Union against Yugoslavia or Rumania | Mid-1980s |
| Conventionalization of nuclear weapons | Beginning with preceding small-country nuclear wars and with shifts of Nth country doctrine | Mid-1980s |
| **B. Increased Global Competitiveness and Nastiness** | | |
| Nuclear blackmail and "local Munichs" | Iran against Persian Gulf countries | Mid-1980s |
| | Libya against Israel | Early 1980s |
| | India against Pakistan | Early to Mid-1980s |
| | CPR against Taiwan | Early 1980s |
| Threats to "go nuclear" | Already made by: Pakistan South Korea, Turkey, and Israel | Mid-1970s |
| Exacerbation or reinvigoration of old disputes | Argentina-Brazil | Mid 1980s |
| | Arab-Israeli dispute | Early 1980s |
| | Libya-Egypt | Early 1980s |
| | Iraq-Iran | Mid- to Late 1980s |
| | Iran-Saudi Arabia | Mid-1980s |
| | India-Pakistan | Early 1980s |
| | Japan-CPR | Mid- to Late 1980s |
| | Japan-Philippines | Mid- to Late 1980s |
| | Indonesia-Philippines | Early 1990s |

TABLE 16 (cont'd)

| Problem or Risk | Some Possible Situations or Cases | Earliest Projected Date Could Emerge |
|---|---|---|
| Increased regional arms racing | Argentina-Brazil | Mid-1980s |
| | India-Pakistan | Early 1980s |
| | Israel-Arab states | Early 1980s |
| | Japan-CPR | Mid- to Late 1980s |
| | Japan-Soviet Union | Mid- to Late 1980s |
| | Turkey-Greece | Early 1990s |
| | Iran-Iraq | Mid- to Late 1980s |
| | Iran-Saudi Arabia | Mid- to Late 1980s |
| Increased superpower arms racing | ABM deployment perhaps triggered by Soviet sense of threat from Nth countries | Late 1980s |
| Superpower confrontations in Nth country disputes | Middle East | Early 1980s |
| | South Asia | Early 1980s |
| | Persian Gulf | Mid-1980s |
| Undisciplined dissemination of nuclear weapons | Possible sources: India; Libya; romantic LDC leader brought into control of nuclear weapons by coup d'etat | Early 1980s |
| C. Intensification of Internal Political Conflict | | |
| Nuclear terrorism | Middle East | Early to Mid-1980s |
| | Western democracies | Early to Mid-1980s |
| Nuclear Coups d'etat, nuclear civil wars, nuclear separatist struggles | Argentina, Brazil, South Korea, Egypt, Turkey, Pakistan, Indonesia, Libya, Greece, Iraq, Spain, Italy, and Yugoslavia | Early to Mid-1980s |
| D. Corrosion of Political Authority and Legitimacy | | |
| Authoritarian global political shift | Particularly within Western democracies if threatened by nuclear terrorism and other anonymous use and/or by increased nastiness of proliferated world | Early to Mid-1980s or Mid-1990s and beyond |
| Loss of governmental legitimacy | Within Western democracies and some LDCs | In conjunction with or following above authoritarian shift |
| E. Economic Costs | | |
| Budgetary costs of increased defense spending to manage problems of proliferation | United States and Soviet Union | Mid- to Late 1980s |
| Non-budgetary economic costs of adjusting to threat of nuclear terrorism | Particularly within free-market economies and Western democracies | Early to Mid-1980s |
| F. Bizarre Events[*] | | |

[*] As stated in the accompanying text, the occurence of such bizarre events is likely, but cannot be specified in advance.

TABLE 17

Problems Posing a Direct Threat to the United States or the Soviet Union

| United States | Soviet Union |
|---|---|
| Few Nth country forces eventually targeted on United States | At least several Nth country forces targeted early on Soviet Union |
| Anonymous nuclear attack | |
| Terrorist use | |
| Conventionalization of nuclear weapons | Conventionalization of nuclear weapons |
| Increased superpower arms racing | Increased superpower arms racing |
| Superpower confrontations arising from Nth country disputes | Superpower confrontations arising from Nth country disputes |
| Undisciplined dissemination of nuclear weapons | |
| Authoritarian political shift | |
| Loss of governmental legitimacy | |
| Budgetary and non-budgetary economic costs | Budgetary costs |
| Bizarre events | Bizarre events |

# V. Critical Policy Approaches

Given both the possibility of increasingly widespread proliferation by the late 1980s-early 1990s and the problems that such proliferation could involve, this section briefly discusses possible American policy approaches and options for slowing the pace and managing the problems of proliferation. Building upon the earlier sections, its purpose is to identify potentially fruitful policy approaches warranting additional, more detailed study.

## Slowing the Pace of Proliferation

Measures to slow the pace of proliferation might attempt to reinforce the constraints upon and reduce the pressures for decisions to develop nuclear weapons. Table 18 lists both types of policy approach.

### Reinforcing Constraints Upon Potential Nth Countries

First, as argued in Section II, the emergence of a nuclear-exports "grey market" and the erosion of present technological constraints upon most Nth countries would be likely to intensify greatly the pace and scope of proliferation. Design of a nuclear-exports policy for preventing that emergence and erosion warrants careful analysis. Concomitantly, attention needs to be focused upon intra-suppliers diplomacy, and more particularly, upon the types of leverage that might be used to produce adherence to a common set of suppliers' rules. In this regard, it might be fruitful to consider possible benefits that could be exchanged for more restrained behavior by other suppliers as well as to examine coercive measures. The possible costs both of rewarding other suppliers for more restrained behavior and of more strenuous efforts to produce a coordinated supplier policy, should those efforts backfire, would, of course, also need to be evaluated.

Second, American and international policies designed to prevent or to circumscribe the consequences of those possible proliferation turning-points that could occur within the next years might also be examined. More specifically, how might the United States attempt to deter or, failing that, respond to the next entry into the nuclear-weapon club, the first withdrawal from the NPT system, the first sale or gift of a nuclear weapon, or the first violation of safeguards agreements?

TABLE 18

Critical Policy Approaches (I):
Slowing the Pace of Proliferation

A. Reinforcing Constraints Upon Potential Nth Countries

1. Nuclear exports policy and intra-suppliers diplomacy
2. Deterring or responding to possible proliferation turning-points
3. A Comprehensive Test Ban Treaty
4. Inflicting costs upon Nth countries

B. Reducing Pressures to "Go Nuclear"

1. Influencing the perceived utility of nuclear weapons
2. Surrogate sources of status and influence
3. Substitutes for independent nuclear forces
4. Nuclear free zones
5. Dampening proliferation momentum

Third, a Comprehensive Test Ban Treaty's possible contribution to slowing the pace of proliferation could be analyzed. So might the types of measures that could be adopted by the United States to foster unanimous adherence to such a treaty by all of the existing nuclear powers. In turn, that analysis might be joined to consideration of responses to future Nth countries' claims to be involved only in PNE programs.

Fourth, means of inflicting costs upon Nth countries could be delineated and evaluated. A range of diplomatic, economic, technological, and perhaps even military options might be examined. Careful attention should be paid to identifying the conditions under which more coercive measures could be appropriate.

However, given the potentially counter-productive effects of attempting to constrain potential Nth countries, equal emphasis probably should be placed upon those approaches, discussed next, for reducing the pressures to "go nuclear."

## Reducing Pressures to "Go Nuclear"

First, and perhaps most importantly, policies to influence the perceived utility of nuclear weapons need to be developed. For instance, more attention should be given to how we should think and talk about nuclear weapons. In this context, careful analysis of variations upon the no-first-use principle would be appropriate. That is, should the United States gradually move towards adoption of a no-first-use policy, perhaps beginning in 1980 with an enunciated policy of no-nuclear-use against non-nuclear-weapon countries? Similarly, examination of how to respond to possible Nth country use of nuclear weapons--discussed in the following section--would also be appropriate here.

Second, possible substitutes for independent nuclear forces have to be identified and evaluated. Various projections of Section II indicate the potential role for a European Nuclear Force (ENF). How might such a force be organized, financed, and linked to the American strategic posture? What should an ENF's objectives be and how soon should movement toward it commence? What role, if any, could the United States play in its creation?

Alternatively, other substitutes for independent forces require thorough analysis. For example, how might a possible American pledge to provide nuclear assistance to a non-nuclear state attacked by a nuclear-weapon state be implemented? Should such a guarantee even be provided? Might it be possible to create a multilateral nuclear force, independent of any one region, whose purpose would be to respond tit-for-tat against

any new nuclear-weapon country that used nuclear weapons against a non-nuclear country? Finally, means of strengthening existing alliances would, of course, warrant careful examination.

Third, the feasibility and mechanics of creating and implementing nuclear free zones need examination. As the preceding projections indicated, once one country within a region develops nuclear weapons there is a high likelihood that others within the region will follow suit. Given that nuclear weapons could spread to both the Middle East and Latin America in the 1980s, attention could focus upon these regions.

Fourth, status and influence considerations are likely to be an important factor in determining whether the more extreme proliferation projections are borne out by events. Means for providing surrogate sources of status and influence should be carefully examined. In this regard, attention might well be paid to how the on-going movement to create new international institutions to regulate trade, resources, monetary matters, energy, and the environment could be used to redistribute global status and influence.

Fifth, measures designed to dampen proliferation momentum should also be considered. Building upon the projections of Section II, critical linkages could be identified. Then, means of severing those linkages and aborting the particular projection might be delineated. In turn, those measures discussed earlier for deterring or responding to potential proliferation turning-points would, of course, also be means to dampen proliferation momentum.

Taken together, the preceding appear to be fruitful approaches for more detailed study. Each might serve to slow the pace of proliferation. And, depending upon that pace, the difficulties in attempting to manage the problems of proliferation would vary.

## Managing the Problems of Proliferation

Notwithstanding such efforts, some further proliferation is likely to occur. It is, therefore, equally necessary to identify policy approaches designed to manage and hopefully reduce the problems of proliferation. Three broad lines of thinking should be pursued, involving efforts to, first, influence the postures and policies of new nuclear-weapon states, second, contribute to regional stability, and third, circumscribe the global repercussions of local proliferation. As should become evident,

some possible approaches are likely to be appropriate for all three purposes. Concomitantly, certain options would also help to slow the pace of proliferation. Table 19 lists possible policy approaches and measures.

## Influencing Nth Country Postures and Policies

First, the advantages, disadvantages, and feasibility of providing technical assistance to Nth countries require careful examination.* Whether to provide that assistance is a complex and tricky question. Such assistance, e.g., on command and control, weapon safety, and force invulnerability could lead to a more stable nuclear force. That could encourage, however, some potential Nth countries that might have been deterred from "going nuclear" because of the risks. Moreover, some types of assistance, e.g., on weapon safety, could also help a country to overcome important obstacles to a more usable nuclear force. Finally, efforts to ensure that such assistance did not create regional asymmetries would be required.

Second, as in the case of policies to slow proliferation, measures to shape perceptions of nuclear weapons' utility and usability are of the utmost importance. Variations upon an American no-first-use policy should be carefully weighed and consideration given to how such a policy might be progressively adopted. More direct ways of influencing Nth country nuclear-weapon doctrine might also be found. One such measure could involve support for the creation of and then American participation in regional equivalents of the NATO Nuclear Planning Group.

Third, prior thinking about how to respond to an Nth country use of nuclear weapons is needed. Avoiding erosion of the nuclear taboo requires efforts to ensure that the consequences of the first use since Nagasaki are contained. But, without a thought-out response, limiting the physical, political, and moral damage that had been done would be more difficult.

Fourth, desirable customs and norms for a nuclear world--along with ways to foster them--should be analyzed. Particular attention ought to be given to the benefits of reinstating the Old Testament principle of lex talionis, i.e., tit-for-tat without escalation. Other customs or norms might include no attacks upon command, control, and communication systems and use only over one's own territory unless in response to a nuclear attack. Such norms might be a subject of discussion within regional NPGs.

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*The provision of such assistance to foster safer and more secure Nth country forces has been suggested by Harold Agnew and others. In addition to the potential difficulties suggested above, providing some types of assistance could clash with obligations under Article I of the NPT.

TABLE 19

## Critical Policy Approaches (II): Managing the Problems of Proliferation

A. Influencing Nth Country Postures and Policies

1. Provision of technical assistance
2. Shaping perceptions of nuclear weapons' utility and usability
3. Responding to Nth country use of nuclear weapons
4. Fostering desirable customs and norms for a nuclear world

B. Contributing to Regional Stability

1. Regional arms-control arrangements
2. Absorbing independent nuclear forces
3. Providing strategic intelligence
4. Providing tactical intelligence and warning
5. Provision of security guarantees to non-nuclear and weaker nuclear countries

C. Circumscribing the Global Repercussions of Local Proliferation

1. Superpower rules of engagement
2. Identifying anonymous attackers
3. Customs, norms, and arms control measures for a proliferated world
4. Dissuading or responding to undisciplined dissemination of nuclear weapons
5. No safe-haven for terrorists
6. Damage-limiting measures and systems

Contributing to Regional Stability

First, possible regional arms-control arrangements should be delineated. Measures to reduce reciprocal fears of surprise attack in those strategic situations characterized by reciprocal vulnerability might be examined. In that context, mini-hot line agreements, troop maneuver agreements, and eventually force size agreements could be examined. The possible establishment of regional Nuclear Planning Groups, mentioned above, might provide a forum for intra-regional discussion. This might help in turn to reduce uncertainty and confusion about the intentions and capabilities of regional opponents.

Second, possible regional institutional arrangements within which to absorb independent nuclear forces also might warrant analysis. For example, creation of a European Nuclear Force might be examined from this perspective, as well as from that of efforts to slow proliferation's pace.

Third, as noted, there is likely to be a good deal of confusion about the intentions and capabilities of many new nuclear countries. But, in some strategic situations, inadequate knowledge about what the opponent(s) are doing could fuel regional arms races and add to regional tensions. Providing high confidence strategic intelligence to all sides about the capabilities and intentions of regional disputants could in such cases be an important stabilizing factor. In others, it might only serve to validate prior fears and suspicions.

Fourth, development of measures for providing short-term tactical intelligence to opposed Nth countries could also warrant closer examination. Sophisticated electronic and satellite surveillance systems, which were able to penetrate each side's command and control system, might allow for outside warning of a surprise attack or, put otherwise, of continued assurances that a nuclear Port Arthur was not about to occur.

Fifth, avoiding nuclear blackmail and "local Munichs" could require outside provision of credible security guarantees to the weaker nuclear and the remaining non-nuclear countries within a given region. Alternative institutional arrangements for doing so need to be designed and evaluated.

Circumscribing the Global Repercussions of Local Proliferation

First, as argued earlier, many strategic situations in the most likely future proliferated worlds would involve links between the local disputants and the superpowers. Possible superpower rules of engagement need to be delineated and assessed. Alternatives to the extreme variants of mutual abstention while the local nuclear war occurs and joint preemption against both local disputants should be sought.

Second, methods of identifying anonymous attackers should be examined. The possible development of suitable procedures which would enable non-perpetrators of an anonymous attack to establish their innocence should not be ruled out.

Third, efforts to foster or reinforce superpower understanding and agreement upon those norms, customs, and arms control measures likely to be necessary for living in a proliferated world could be pursued. A protocol of issues which might be raised and discussed in future SALT talks and other forums might be usefully developed.

Fourth, policy options for dissuading or responding to the undisciplined global dissemination of nuclear weapons merit analysis. Possible coordinated action with the Soviet Union should not be ruled out.

Fifth, ways to reach international agreement on the principle of no safe-haven for terrorists should be considered. Such a principle might make an important contribution to controlling nuclear terrorism. And, it would do so without the adverse effects of most other controls.

Sixth, various potential damage-limiting systems could be evaluated. For instance, the possible case for mutual negotiated Soviet and American deployment of light area BMD systems needs to be closely examined. From the American perspective, a critical question is whether such a system would reduce the types of risks that the United States, as opposed to the Soviet Union, is likely to confront.

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This concluding section of Hudson's report has identified briefly a series of policy approaches warranting detailed examination. Such examination exceeds the scope of this report. However, if undertaken, an analysis of these approaches could be particularly fruitful in designing specific policy options to slow the pace and manage the problems of future proliferation.

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