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20. ABSTRACT (Continue on reverse side if necessary and identify by block number) Identifies five meanings currently given to the term nuclear threshold, analyzes the nuclear threshold concept and related concepts, and makes recommendations on terminology. Discusses the origin of the nuclear threshold concept, the reasons for its development, and the factors that may recently have made the concept less clear and useful. Concludes that if limitation of conflict is sought, continued respect for the boundary between nonnuclear and nuclear weapons appears to be desirable in the absence of strong evidence that it is no longer serviceable.		

ANALYTIC RESEARCH ON
STRATEGIC, TACTICAL AND DOCTRINAL
MILITARY CONCEPTS

The Nuclear Threshold Concept

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THE NUCLEAR THRESHOLD CONCEPT

EXECUTIVE SUMMARY

The nuclear threshold concept, like the concept of deterrence, represents an effort to deal in a rational way with the overwhelming destructiveness of nuclear weapons -- to construct a rationale that makes their power available for use in the nation's interest without bringing about cataclysmic devastation. The concept centers on the difference between nonnuclear weapons and nuclear weapons, the line separating one from the other. The concept seeks to use this dividing line as a means of limiting war.

There are currently two basic problems connected with the meaningful use of the nuclear threshold concept. One is the problem of definition of terms: The term nuclear threshold is used in so many different ways that real discourse about the concept is difficult. The second is the question of whether the distinction between nuclear weapons and nonnuclear weapons has been made obsolete by technological changes, shifts in the balance of military strength, changed perceptions of Soviet strategy, and the spread of nuclear weapons to additional countries.

DEFINITION OF TERMS

The report identifies five senses in which the term nuclear threshold is currently used:

- The scientific line that separates nuclear weapons from conventional weapons, with regard to their physical nature.
- An alleged sharp increase in destructiveness and lethality between conventional weapons and nuclear weapons. This may also be expressed as a gap between the lethality of the most lethal conventional weapon and the lethality of the least lethal nuclear weapon.
- The line between not possessing nuclear weapons and possessing nuclear weapons.
- The operational line that separates nonuse of nuclear weapons from use of nuclear weapons.
- The point at which firing of nuclear weapons would be resorted to, or the provocation for which nuclear weapons would be considered the appropriate response.

After exploring the validity and usefulness of these concepts, and of applying the term nuclear threshold to them, the report makes the following recommendations on terminology:

- The term should not be used for the dividing line between not possessing nuclear weapons and possessing nuclear weapons (as in, "India has crossed the nuclear threshold.")
- The term should not be used for a gap in lethality between the most lethal conventional weapons and the least lethal nuclear weapons. ("The deadliest [conventional] weapons are now more powerful than the smaller nuclear weapons [and thus] the nuclear threshold has been breached.") The nuclear threshold concept does not depend on such a lethality gap, whether or not it exists.
- The term nuclear scientific line appears to be a clear and useful term for the line that separates conventional weapons from nuclear weapons, on the basis of their scientific nature.
- The term nuclear boundary appears to be a clear and useful term for the operational line between the nonuse of nuclear weapons and the use of nuclear weapons. The nuclear boundary, in this sense, is the line on a spectrum of conflict that separates nonnuclear weapons from nuclear weapons.
- The term nuclear threshold appears to be best applied to the point on a spectrum of provocation, or military necessity, at which nuclear weapons would be resorted to. The nuclear threshold can be raised or lowered; the nuclear boundary does not move.
- A firebreak, in strategic discourse, is a clearly discernible boundary line on the spectrum of conflict that is respected as a stopping point and crossed only under great provocation or extreme military necessity. The nuclear firebreak is a firebreak at the nuclear boundary.
- The nuclear taboo is a strong reluctance to use nuclear weapons that is reinforced by tradition and feelings of moral prohibition.

Figures 1, 2, and 3, copies of which are attached to this executive summary, should further clarify these definitions.

CONTINUED VALIDITY OF THE CONCEPTS

The report discusses a number of recent developments that may appear to have blurred the scientific nuclear line and the nuclear boundary, and/or undermined the validity of the nuclear threshold concept in limiting war. The following tentative conclusions are reached:

- The scientific nuclear line has not been blurred or threatened by the development of new, more destructive conventional weapons or new, less destructive nuclear weapons.

- Because of the existence of new weapons, there is some question as to whether the difference, in combat use, between conventional and nuclear weapons will still be clear in all cases. If it is not clear, the nuclear boundary would be threatened, as would the validity of the nuclear threshold concept. Further investigation, with the assistance of weapons specialists, is needed on this matter.
- Proliferation of nuclear weapons should not invalidate the nuclear boundary and nuclear threshold concepts.
- There is some question as to whether probable Soviet war strategies threaten or invalidate the nuclear boundary and nuclear threshold.
- There appears to be no other boundary line within the spectrum of conflict with anything approaching the clarity of the nuclear boundary. If limitation of conflict is sought, continued respect for the nuclear boundary firebreak appears to be desirable, in the absence of strong evidence that it is no longer serviceable.

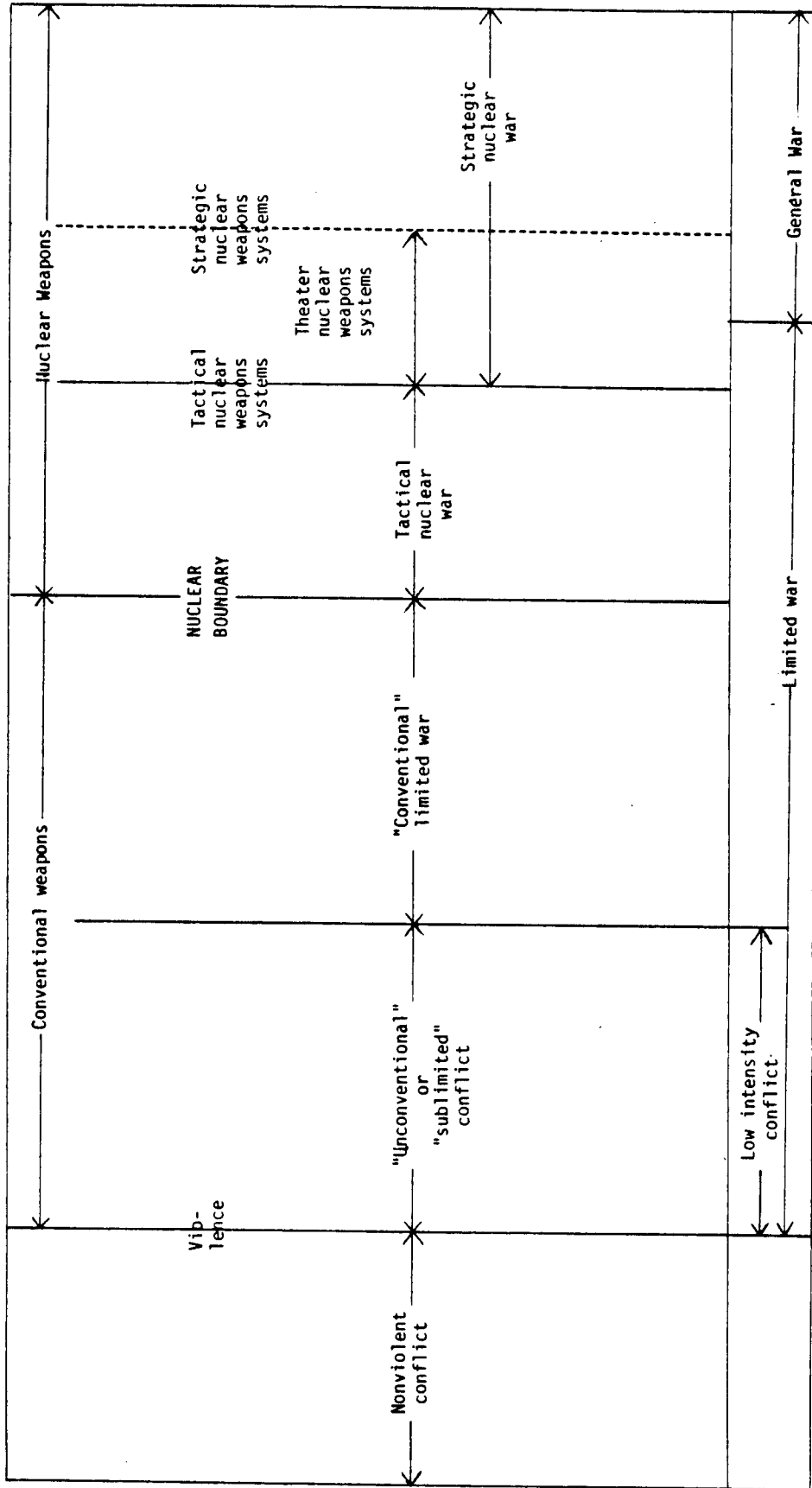


Figure 1: Spectrum of conflict, showing nuclear boundary

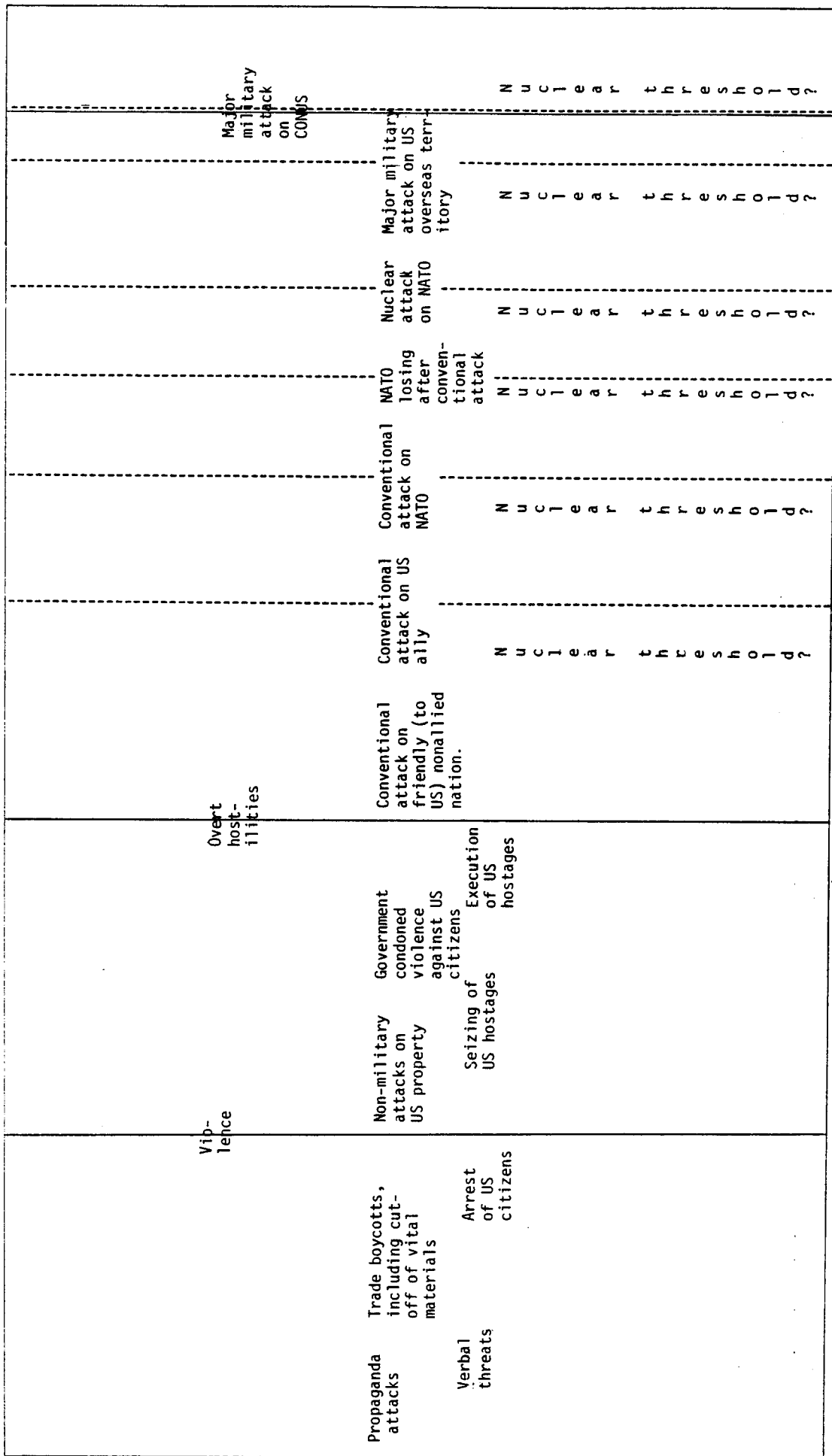


Figure 2: Spectrum of provocation, showing sample possible positions for nuclear threshold

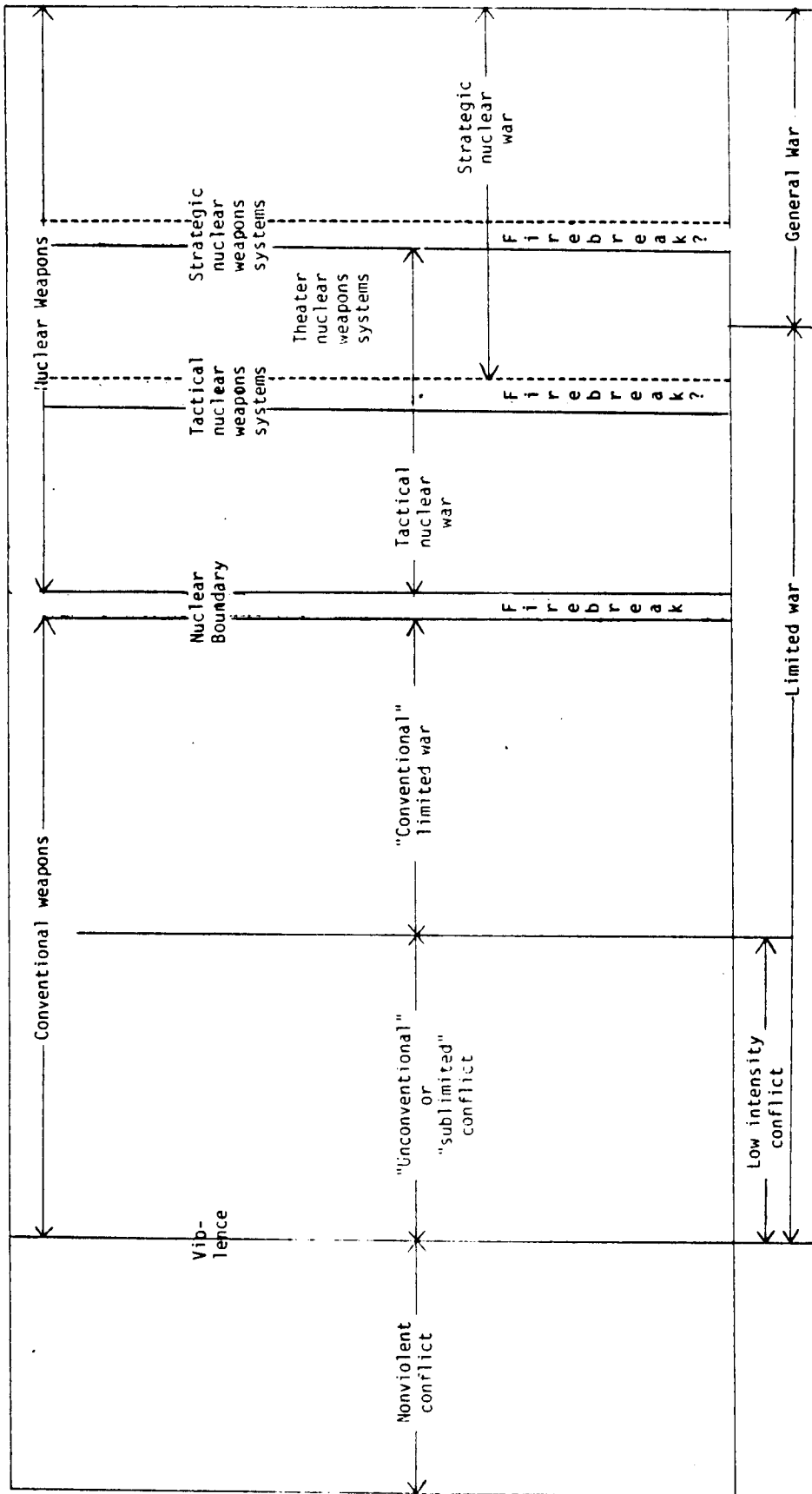


Figure 3: Spectrum of conflict, showing firebreak

THE NUCLEAR THRESHOLD CONCEPT

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THE NUCLEAR THRESHOLD CONCEPT

The concept of a nuclear threshold, like the concept of deterrence, represents, fundamentally, an effort to deal in a rational way with the overwhelming destructiveness of nuclear weapons. The first nuclear weapons burst upon the world in 1945 with tremendous power, figuratively as well as literally. These explosions were different in kind, not just in degree, from all previous explosions on this planet, and were immediately perceived as such. Their extraordinary destructiveness was exaggerated in the press and public opinion even beyond its real dimensions. Many concerned persons felt that nuclear weapons made war impossible or made world government necessary if the destruction of the world was to be avoided.

Responsible statesmen and analysts, seeing that utopia was not likely to arrive immediately and that the reality of nuclear weapons had to be dealt with, responded with the deterrence concept -- briefly, the use of nuclear weapons to prevent the firing of nuclear weapons, through the careful structuring and deployment of one's nuclear forces -- and with a number of related concepts, including that of the nuclear threshold.

The several meanings with which the term nuclear threshold is used will be discussed below, as will such related terms as firebreak and nuclear taboo. More precise terminology will be recommended in some cases. At the outset, however, it seems necessary to describe the central idea of the nuclear threshold. Basically, this is the idea that nuclear weapons are different in kind as well as degree from other weapons, that the extraordinary destructiveness of the highest-yield nuclear weapons (those with the force of millions of tons of TNT) means that extraordinary efforts should be made to avoid using them, and that for this reason and others, including the emotional connotations of differentness and horror that have attached themselves to nuclear weapons, the line between nuclear and non-nuclear weapons is an extremely important line, and the first use of nuclear weapons in conflict (since 1945) is an extremely important step to take. This nuclear threshold idea has thus become an important obstacle for those who believe that the United States must be ready to use various types of nuclear weapons freely in those situations where purely military considerations would dictate their use. The weight of public opinion, including the press and influential opinion, still seems to support the importance of the nuclear threshold idea.

Critical and objective examination of the concept, or concepts, involved seems called for.

There are currently two basic problems connected with the meaningful use of the phrase nuclear threshold. One is the problem of definition of terms: Nuclear threshold is used in so many different ways that real discourse about the concepts involved is difficult. The second is the question of whether the distinction between nuclear weapons and nonnuclear weapons has been made obsolete by technological changes, proliferation of nuclear weapons, Soviet attitudes toward nuclear weapons, and shifts in the balance of military strength.

DEFINITION OF TERMS

Unlike the case with the concept of deterrence, there is almost no literature dealing specifically with the nuclear threshold concept. A search by the Library of Congress computer found no book on the subject, and hardly an article could be found in which the nuclear threshold was the central theme. A careful search through likely literature had to be made for mentions, definitions, and passages dealing with the concept. Often there was no specific mention of the term nuclear threshold in a passage that implied the concept's existence in discussing, for example, the dangers of escalation from the use of tactical nuclear weapons. The author formed the impression that the term and the concept -- or concepts -- to which it refers are used at least as much in oral discussion in the defense community as in analytic literature. Under these circumstances, an exploration and clarification of terminology seemed a particularly appropriate place to begin a study of the subject.

Following are the chief meanings for the term nuclear threshold that have been found in the literature -- either explicitly stated or implied -- during the preparation of this report:

1. The scientific line that separates nuclear weapons from conventional weapons, with regard to their physical nature. Conventional explosive weapons produce their explosive effect through a chemical reaction, one product of which is large amounts of energy. In this chemical reaction and the consequent explosion, only the electrons orbiting the inner nucleus of the individual atom are involved; the nucleus itself is not. In a nuclear explosion, the nucleus is changed, the tremendous force that holds it together is freed, and amounts of energy greater by orders of magnitude than those of a chemical-reaction explosion are released. In a nuclear fission chain reaction, the force released is 20 million times greater per atom than

than that of the most powerful conventional explosion.*

This dividing line between conventional and nuclear weapons is not explicitly referred to as a nuclear threshold in any of the literature examined, but it is included here because it is a relevant nuclear/nonnuclear dividing line, or threshold, and because all the other concepts to which the term nuclear threshold is applied depend fundamentally on this scientific distinction.

2. A sharp increase in destructiveness and lethality between conventional weapons and nuclear weapons, which may also be expressed as a gap between the lethality of the most lethal conventional weapon and the lethality of the least lethal nuclear weapon. This is the sense in which the term was used in a Washington Post interview by Bernard Nossiter with a British scientist, J.P. Perry Robinson, in 1978. Nossiter reported Robinson's findings as follows:

The killing power of modern conventional weapons has increased so rapidly that the deadliest are now more powerful than the smaller nuclear weapons.

This means that the nuclear threshold has been breached and technology has made obsolete a key argument over whether or not to deploy the neutron bomb. [Emphasis added.]**

3. The line between not possessing nuclear weapons and possessing nuclear weapons, which may include carrying out test detonations. "Nations in the second tier of the global order are reaching the nuclear threshold (in the case of India, that threshold has been crossed).***

4. The operational line that separates nonuse of nuclear weapons from use of nuclear weapons. This meaning refers to the nuclear threshold as a stopping point, a boundary, on the spectrum of conflict that stretches from the first minimal use

* Victor F. Weisskopf, "A Peril and a Hope," Physics Today, July 1978, p. 30. The JCS Dictionary (1974) definition of a nuclear weapon is "A device in which the explosion results from the energy released by reactions involving atomic nuclei, either fission or fusion, or both.

** July 1, 1978, p. F1.

*** Richard E. Bissel, "The Many Faces of Nuclear Policy," Orbis 22:279 (1978)

of force to an all-out nuclear conflict. Nuclear threshold in this sense is best explained, to the current author's knowledge, by Thomas Schelling (1966). (See bibliography annotation.) Schelling discusses several possible "thresholds" between minimal force and general nuclear war, and concludes that the nuclear-conventional distinction is the clearest, and thus the most useful. This concept of nuclear threshold as a clear operational boundary line within the spectrum of conflict is based on the scientific difference between nonnuclear and nuclear weapons, but it is not identical with it. One is a difference in scientific nature, the other a dividing line between two kinds of military action.

5. The point at which the firing of nuclear weapons would be resorted to, or the provocation for which nuclear weapons would be considered the appropriate response. This is the meaning intended when a writer speaks of "raising the nuclear threshold." The nuclear threshold, in this meaning of the term, can be raised in at least two ways: by developing and deploying "sophisticated" nonnuclear weapons that can accomplish the same missions nuclear weapons would earlier have been assigned; and by making a policy decision that certain provocations that earlier were considered to call for response with nuclear weapons do not in fact require such a response. Thus, precision-guided munitions (PGMs) have recently been said to raise the nuclear threshold, and the shift from a declared "massive retaliation" policy to a "flexible response" policy, which began soon after the former policy was enunciated (1954), was also a raising of the nuclear threshold. Raymond Aron described the function of nuclear threshold in this sense (he actually used the term "atomic threshold") by saying that it has "meant simply that a border incident or act of local aggression would not be answered by atomizing a city." (Aron 1964:46).

If the United States had a no-first-use policy for nuclear weapons, then the nuclear threshold would lie at the point where an enemy used nuclear weapons against the United States. If the US nuclear umbrella over NATO is interpreted as meaning that any attack on Europe would mean a nuclear response, whether strategic, theater, or tactical, then the nuclear threshold lies at the point where NATO is attacked. Some would urge that a conventional attack should be met with conventional defense forces and that nuclear weapons should be used only if NATO forces face imminent defeat. If this approach is followed, the nuclear threshold lies at the point at which an invaded Europe is facing imminent defeat. Some analysts now favor "lowering the nuclear threshold," by readily using newer tactical nuclear weapons with carefully tailored characteristics for any combat situation for which they fit the military requirements.

The difference between this meaning of the term nuclear threshold and the meaning described above as 4. may appear oversubtle, but it is real and is important for a rigorous clarification of the concepts involved. Meaning 4. is the line between use and nonuse of nuclear weapons. It lies on a continuum of violence stretching from minimal force to all-out nuclear war. Meaning 5. is the occasion calling for use of nuclear weapons. It lies on a continuum of provocations and military necessities stretching from, say, minor border incidents that involve US interests only indirectly to direct nuclear attack on the United States. It can be shifted up and down that continuum by policy decisions that change the gravity with which various provocations or military necessities are regarded, in relation to the gravity of using nuclear weapons. It can also be shifted up and down by decisions as to the effectiveness of conventional weapons for carrying out given military tasks. Finally, it can be shifted up or down by decisions as to the importance of respecting the boundary line between use and nonuse of nuclear weapons; the existence of very low-yield nuclear weapons could well bring about a shift downward in the nuclear threshold. (See Figures 1, 2, and 3.)

Related Terms

Two other, related terms, firebreak and nuclear taboo, should also be noted at this point.

The term firebreak, which originated in the early 1960s, is a metaphor taken from firefighting, where it means a strip of cleared ground that acts as a barrier to the uncontrolled spread of a forest fire. In strategic discourse, it means a boundary line, or threshold, on the spectrum of conflict that is respected as a stopping point and only crossed under great provocation or extreme military necessity.* The nuclear threshold (in sense 4.) has been the firebreak generally favored by analysts and policy makers, and when the term "firebreak" is used, it is generally understood to mean a firebreak at the nuclear threshold. However, the terms nuclear threshold and firebreak are not necessarily synonymous. Some analysts would like to move the firebreak, setting it between tactical and strategic nuclear weapons or tactical and theater nuclear weapons.**

* Raymond E. Bell, who made useful contributions to this paper, has identified a corresponding term, and similar metaphor, in the German-language literature of the subject -- atomare feuermauer (atomic firewall). Franz Freistetter, "Konfrontationen -- Konflikte -- Kriege," Osterreichische Militarische Zeitschrift, Heft 2/1977.

** This latter is the choice of Major John Rose, an Army specialist on tactical nuclear weapons and doctrine. Personal communication, August 10, 1979.

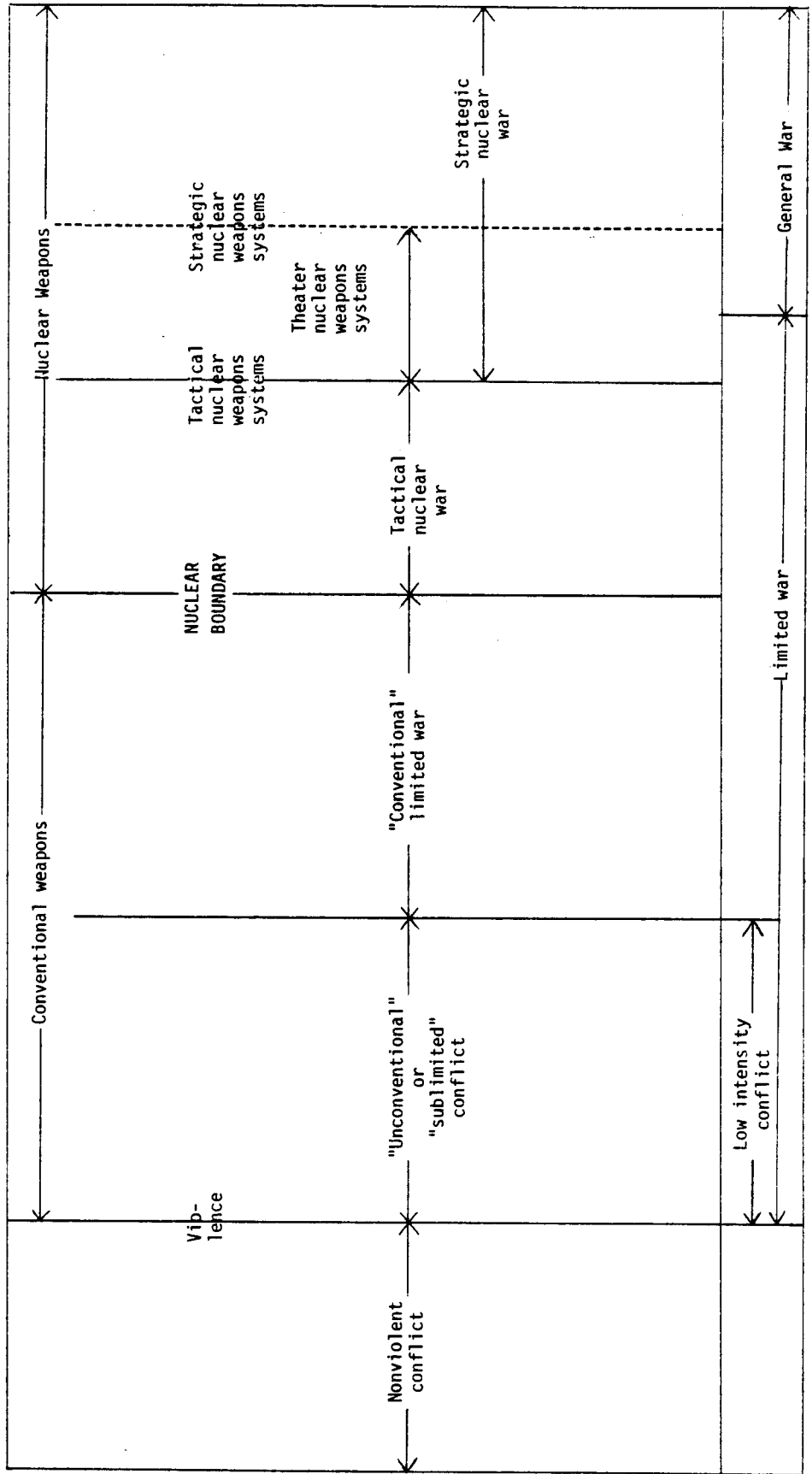


Figure 1: Spectrum of conflict, showing nuclear boundary.

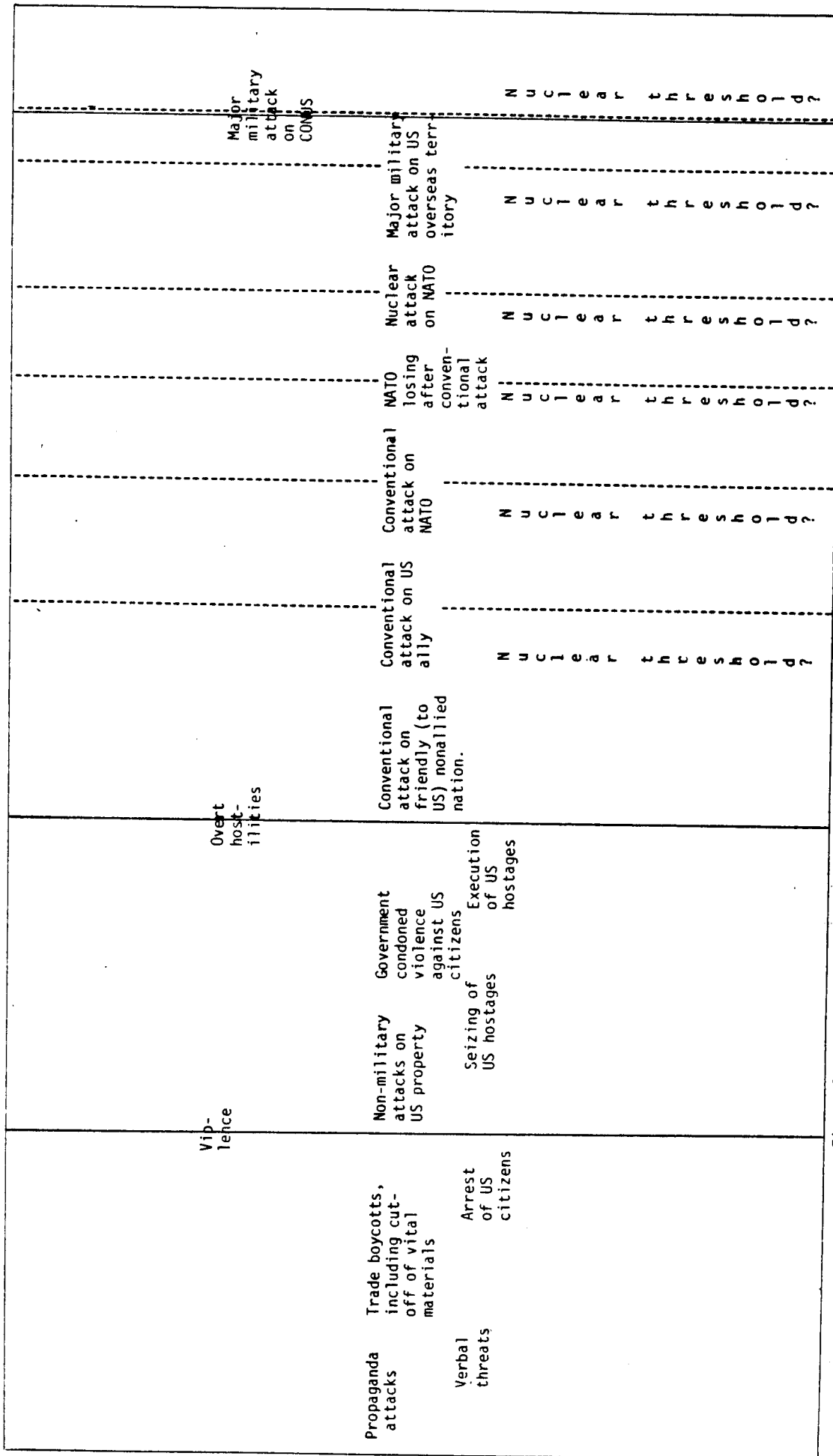


Figure 2: Spectrum of provocation, showing sample possible positions for nuclear threshold

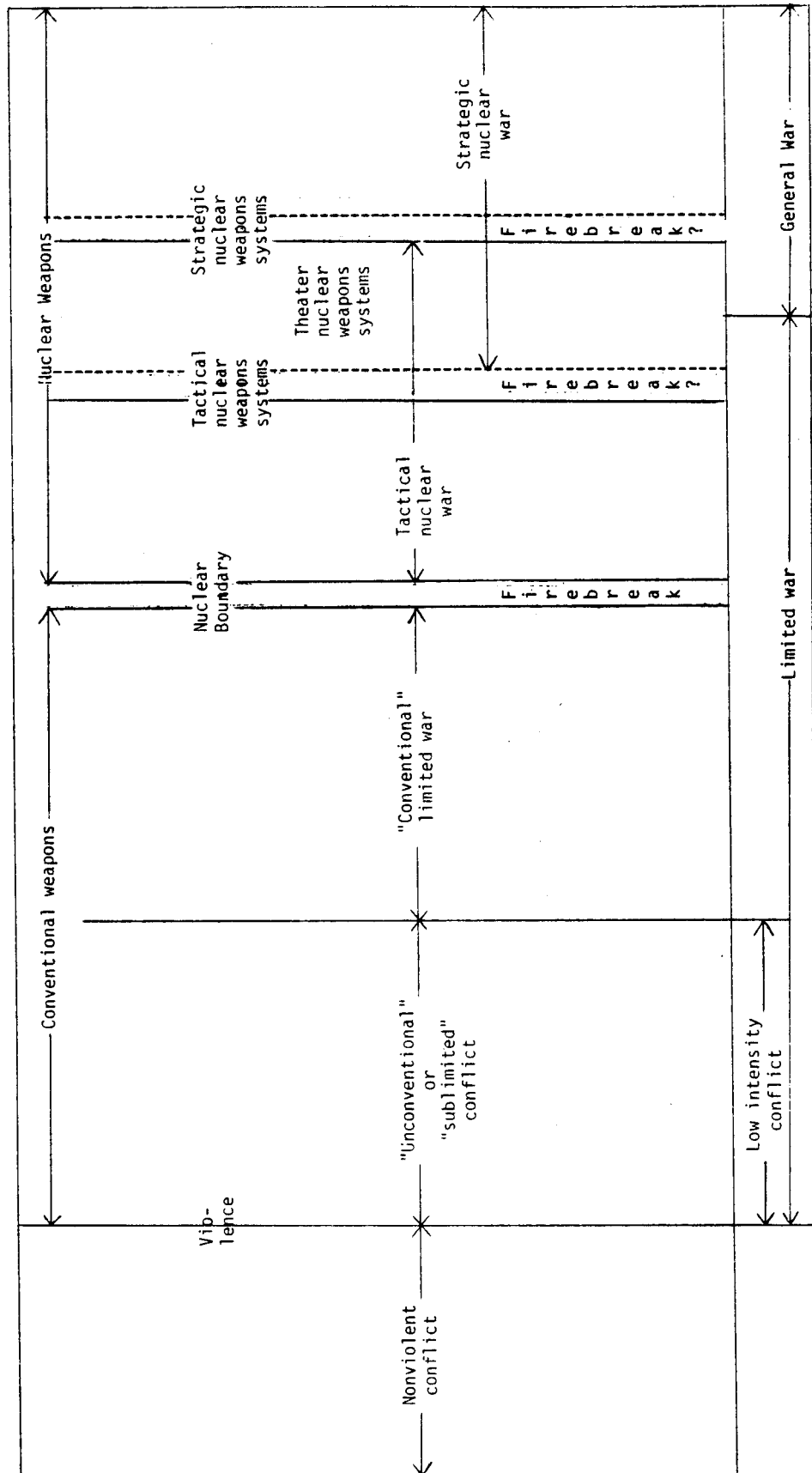


Figure 3: Spectrum of conflict, showing firebreak

The nuclear taboo may be defined as a strong reluctance to use nuclear weapons that is reinforced by tradition and feelings of moral prohibition. To explore the origins and development of the nuclear taboo would require a separate and extensive research effort. However, its existence and relation to the nuclear threshold must be mentioned.

In addition to the realistic, scientific difference in kind between conventional and nuclear weapons, and the realistic recognition of the much greater devastation that can be wreaked by nuclear weapons, there is undoubtedly a widespread and strong socio-psychological distinction drawn by both elites and mass publics between the two categories of weapons. Feelings of horror are associated with nuclear weapons that are probably out of proportion to their greater lethality and destructiveness, except in the case of multimegaton thermonuclear weapons. The invisibility of the subatomic particles causing radiation effects; the widespread and uncontrollable dispersion, and delayed and long-lasting effects, of some of these particles; their effects on the reproductive system and thus on future generations; the fact that the first use of the weapons was against populations who had no warning and no protection and thus were especially severely damaged -- these are among the reasons for the special feelings of horror that reinforce the nuclear taboo. If the line between nonnuclear and nuclear weapons is significant, the nuclear taboo has value in enhancing it. If the firebreak concept has value, the nuclear taboo adds to the claims of the nuclear threshold, or nuclear boundary, to be the firebreak line. If the nuclear threshold idea is properly considered obsolete, then the nuclear taboo is a powerful hindrance to doing away with it.

Recommendations

How can some order be brought out of the various meanings with which the term nuclear threshold is used? Perhaps the best place to begin is with the clearing away of some underbrush of the less useful meanings.

It would seem wise to eliminate immediately meaning 3., the line between nonpossession and possession of weapons. This use only breeds confusion. It is most unfortunate to have the same phrase -- "crossing the nuclear threshold" -- used to mean either acquiring nuclear weapons or firing them for the first time (since 1945) in conflict. This is a recent use of the term and should be relatively easy to eradicate. One can thus wholeheartedly urge members of the defense and academic communities not to use the term nuclear threshold in this way.

The next unfortunate use is 2., the sharp increase in destructiveness between conventional and nuclear weapons. Although certainly the extraordinary destructiveness and lethality of the most destructive nuclear weapons are the heart of the whole nuclear threshold question, no informed person has ever claimed that any nuclear weapon system was necessarily more lethal or