

The strategic dilemma: probability versus disutility

A review of Herman Kahn, *On Thermonuclear War*

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Perhaps one of the most fruitful ways of examining individual or group decisions is by using a probability-utility model (16, 19). In such a model, one is able—for analytical purposes at least—to divide the considerations which went into the decision into two distinct sets of variables. One set deals with the decision-making unit's estimate of the probability of a wide range of outcomes; the more "rational" that decision-maker (individual or group) is, the closer he will come to considering, and assigning a subjective probability to, all possible outcomes. The other set of variables concerns the positive or negative value which he assigns to each of these postulated outcomes; in contemporary parlance, these are known as utilities and disutilities.

Such a model has two virtues. For those making the decisions, it compels them not only to delineate the whole range of conceivable (to them) alternative outcomes, but to articulate their value preferences by ranking possible outcomes in order of such preference. It leads to a conversion of implicit values into explicit ones which may be discussed and debated when a choice point is confronted. The second virtue is that it permits the observer to discover the value system

of the decision-maker or policy-proposer, even if that individual or group did not itself make these considerations explicit. Thus, the student of politics is able to translate a welter of subjective decisional criteria into a manageable set of variables, even while recognizing that both are completely subjective to the decisional unit (16).¹

In Herman Kahn's *On Thermonuclear War* (5), the author has provided us with an opportunity to employ this probability-utility model in examining a number of proposed policy decisions. He closes his preface by indicating that the book was written in the "hope of decreasing the probability of catastrophe [thermonuclear war] and alleviating the consequences" if it comes. Thus, Mr. Kahn begins with at least an implicit concern for the probability and the disutility of an outcome which concerns us all. What shall concern us in this review is the relative priority he gives to a variety of probabilities and utilities/disutilities in reaching his own decisions and those he would press upon an

¹ An interesting philosophical question is raised here by asking whether the decision is a result of objective external phenomena or the subjective preferences and predictions of those "making" the decision. I would say both.

anxious nation. To put the issue another way, is the author more interested in lowering the probability of nuclear war, or in lowering its destructive effects? Is he more interested in lowering the probability of direct attack or in lowering the probability of diplomatic blackmail? The burden of my analysis will be that, in matters of strategy, interests of this kind are always to a great extent incompatible, and that one is always compelled to assign greater value to one or the other of them. Let us examine, in turn, some of the major policy recommendations which emerge from this long- and eagerly-awaited tome.

The Probabilities of Success

Let us look first at the type of decisions Kahn would have the United States make in order to deter the Soviet Union from various forms of aggressive behavior. That is, what kinds of strategies and capabilities does he predict will produce what kinds of probable outcomes?

Though not completely comparable,² the three types of deterrence which concern our author are, for the most part, distinguishable and significant. What he calls type I deterrence is that intended to prevent a direct strategic assault on continental North America. Type II deterrence is designed to prevent or inhibit extreme provocations—political or military—other than direct assault on the United States. Type III deterrence—which seems to overlap considerably with type II—is intended to restrain the adversary from going beyond certain territorial or weaponry bounds in a limited military conflict. Let us examine the doctrines and capabilities which Kahn considers appropriate to these types of deterrent.

² The lack of comparability arises because types I and II are classified by Kahn (p. 126) in terms of the *behavior to be deterred* while III is described in terms of *what the deterrer* will do "to make the aggression unprofitable."

The deterrence of direct military assault on the United States (or Canada) seems to be the one to which he assigns primacy, and he starts out by flogging several very dead horses. First, he implies that his is a voice in the wilderness (if I may mix my metaphors) in urging that the crucial figures are not pre-attack inventories on both sides, but "estimates of the damage the retaliatory forces can inflict after they have been hit and hit hard" (p. 128). Similarly, he is hardly alone in emphasizing the naïveté of assuming that the victim's³ retaliatory force will have been launched *prior* to the impact of any opening first strike. The literature, the press, and the halls of the Pentagon are full of talk about hardening, dispersal, concealment, etc., as techniques of achieving "invulnerability"; i.e., preserving enough of one's strike-back missiles and bombers from an attack in order to permit a punitive retaliatory blow.⁴

He then goes on to inveigh against the "finite" or "minimum" schools as being inadequate for the demands of a type I deterrent, noting (metaphorically) that it will have to work in the darkness of a winter night as well as in the sunshine of a bright summer day. This inadequacy, he contends, arises from the erroneous assumption that nuclear war is tantamount to mutual annihilation. As a matter of fact, his entire approach to strategy is based on the assumption that, while it would be an "unprecedented catastrophe" (p. 10), it would not be a limitless one; this will be brought out below in discussing passive defense. By their postulation of

³ Kahn uses the word "defender" here, but it is perfectly evident that weapons technology has so corrupted traditional notions of defense that the victim's reaction must be about 75 per cent retaliatory and offensive, and only about 25 per cent defensive. On this matter see (15).

⁴ These, and other criticisms, may have been valid when Kahn first began to lecture on strategy, but they are now very dead horses. Perhaps he educated the rest of us too well!

automatic mutual annihilation, Kahn contends that the finite deterrents not only overlook the limits of destruction which a damaged strike-back force can inflict but those limits imposed by an active and passive defense system instituted by the attacker and alerted well in advance of the reprisal. Further, he disputes the notion that a temptation to get in that all-important first strike will be negated merely by the possible loss of a number of population and industrial centers. Next, he ridicules the finite deterrents for neglecting the role of accident, miscalculation, or irrationality in initiating a nuclear-missile exchange. And finally, he assails this school on the ground that it would eschew any emphasis on active or passive defense. Here the straw man becomes too obvious, and it is only by accepting Kahn's definition of the finite deterrence doctrine that we can accept his criticisms as valid.⁵ As far as I know, those of us in the finite deterrence school are not opposed to *active* defense (ground-to-air interceptors, etc.) and only some of us are dubious about *passive* (civil) defense. Moreover, none of us would deny the value of pursuing invulnerability and certain types of alert and early warning; nor is there any lack of concern for the probability of accident or miscalculation.

Having slain a rather feeble and fictitious dragon, Kahn then goes on to the problem of the type II deterrent, and here he is more interesting and more accurate. The question now is not so much the obvious one of deterring attack by threat of "certain" reprisal, but of utilizing a military capability for the other and more subtle purposes of diplomacy in an anarchic international system. The goal here has two facets: one is to *prevent the Soviets* from threatening nuclear war in order

to make political gains, and the other is to *permit the United States* to threaten nuclear war in order to make its own political gains.

According to Kahn, both of these are only likely to be realized if the United States creates a credible first-strike capability.⁶ Thus, one can threaten to use this capability if the adversary does not back down from a threatening position, or if he refuses to accede to a demand of your own. His major illustration here is a Soviet attack (nuclear or conventional) on Western Europe, following which the White House would face an awesome dilemma. The threat to retaliate *could* be carried out, but since it would be based upon little or no counter-force (i.e., able to destroy Soviet launch sites, etc.) capability, and no active or passive defense of consequence, it would not only mean that the United States had *started* the war, but that it would then have to absorb a devastating retaliatory blow. Therefore, Kahn argues, a finite strategy leaves the West in a terrible quandary, whose resolution can only be achieved by acquiring a counter-force capability and by instituting active and passive defense measures at home. This is essentially what he means by a credible first-strike capability, and though space precludes a fuller inquiry into some of the more fascinating speculations he introduces, this is the essence of his approach.

To the initiated, these seem to be the same arguments made by the advocates of a limited war (conventional and/or nuclear) capability (7, 9, 11, 13, 14, 18) and though Kahn does favor the development of such a capability in order to cope with these less clear-cut situations, he considers it less than adequate. Furthermore, he would contend that a type II deterrent also requires a pre-attack mobiliza-

⁵ For a less sophisticated but highly pungent attack on the strategy see John F. Loosbrock's editorial, "Minimum Deterrence Is a Phony," *Air Force*, vol. 43, no. 10 (October, 1960), p. 6.

⁶ In his own whimsical fashion, Kahn has capitalized this and many other phrases, allegedly for purposes of emphasis, but I hope he will pardon my refusal to be an accomplice in slogan-making.

tion base so that, in times of tension, that base can be visibly mobilized in order to enhance the credibility of one's first-strike threats and impose an additional inhibition against potential aggression or "outrageous provocation."⁷

Summarizing Kahn's proposals for minimizing the probability of nuclear war, we find that he insists on going well beyond the finite doctrine associated with an invulnerable counter-city capability to be fired only for retaliatory purposes. He would have the United States develop: a counter-force and hence credible first-strike capability, a doctrine which does not exclude the pre-emptive or preventive strike, and a pre-attack mobilization base, including a massive evacuation and shelter program. Without this combination of doctrine and capability, he would argue, one cannot expect to deter the wide range of behavior with which the adversary might be inclined to confront the West. Let us now turn to what is perhaps the most unique contribution of *On Thermonuclear War*—what if deterrence fails?

The Disutilities of Failure

As I have already indicated, Kahn considers the institution of passive, civil defense measures to be a major element in reducing the probability of nuclear war.⁸ However, he also urges such a program in order to reduce

the disutility of such war if the over-all deterrent turns out to be unsuccessful. Based on studies which he directed earlier at Rand (5a,6), his discussion of civil defense centers on the proposition that nuclear war is *not* equivalent to mutual annihilation, and that with appropriate measures, a nation's damage may be materially diminished.

He therefore proposes a one- to two-year program involving an expenditure of 500 to 600 million dollars (more than ten times the current annual United States defense expenditures) for: radiation meters (100 million), modifying existing buildings (150 million), research and development in shelter building (75 million), and other programs.⁹ His justification is based on the following predictions. If the Soviets were to get in a first strike aimed at SAC bases and the 50 largest urban areas, the casualty level could be reduced from about 90 million to somewhere between 5 and 25 million Americans, were a minimum fallout and evacuation program instituted. A later attack directed at SAC and 157 urban areas could likewise (according to Kahn's calculations) produce casualties ranging from 3 to 160 million depending on the degree of protection in which we have invested (p. 113).

Another argument he makes concerns the recuperative process for the people and equipment remaining after a nuclear attack.¹⁰

⁷ Since I am unable to discern any appreciable difference between his analysis of types II and III, and am already short of space, I will attempt no further discussion of this latter. It should be noted, however, that he makes an excellent case against the use of tactical nuclear weapons in type II or III situations where limited war becomes a factor.

⁸ His position is not altogether clear on this, however. In one place, he argues that "non-military defense may have an important role in deterring the Russians from extremely provocative behavior, but this is different from deterring an attack on the United States" (p. 115, note 5).

⁹ For a detailed and thoughtful explanation of his proposals, see Appendices II, III, and IV, pp. 597-640. On the physical and social implications of an attack on the United States see (2, 8, 12, 17, 20).

¹⁰ It should be noted that his concern here is not with being able to continue the war but with post-war re-building. He assigns a very low probability to a "broken-backed" war of long duration and predicts truce negotiations "a few days" after an opening exchange (pp. 107, 219). This prediction is more likely to be true if those empowered to negotiate survive such an exchange.

He does this by dividing the nation into two "countries": A country contains 50 to 100 of the largest cities, and B the remaining smaller cities, towns, and rural areas (p. 77). In pointing out that only a small portion of A country's activity is contributed to B country, and that A needs B while B does not need A, he concludes that the resources and skills of B country could rebuild A in about ten years, depending on destruction absorbed. For example, he calculates that with only 2 million casualties, the United States could recuperate economically in one year, while 10 million would take 5 years, 80 million 50 years, and 160 million 100 years. At the end of this chart (p. 34) he asks the rhetorical question: "Will the survivors envy the dead?" He is not sure.

Another crucial element in his case for civil defense and for discounting the destructive effects of nuclear war is his analysis of the genetic hazard, especially in terms of dosages of radioactivity that can be absorbed safely and the degree of illness or malformation we experience even in peacetime. This is an extremely complicated business, which I do not claim to comprehend, and as Kahn points out frequently, it is a highly charged emotional one as well. Thus, rather than discuss his extensive findings and predictions, let me urge the reader to evaluate this material himself. Some have charged Kahn with callousness and a complete contempt for human life because of his statistical approach to casualty and survival figures, but I doubt whether the arraignment is fair.

My own criticism is that the context employed contributes to what might be called the "rising threshold of acceptable destruction," but if one is willing to discuss nuclear war at all one must also discuss the degree of human catastrophe which might be involved. Moreover, it would be irresponsible of the author to have proposed policies which could lead to these consequences with-

out admitting their nature and extent. And since Kahn is one of the few who is not entranced and bewitched by the deceptively optimistic speculations of the deterrent doctrines, it is to his credit that he also gives serious thought to the disutilities which must accompany any low probability of successful deterrence.

Provocation and Reconciling the Incompatible

Having discussed the author's efforts to minimize both the probability and disutility of failure, let us turn now to the problem of reconciling these two concerns. I have already indicated the impressiveness of Kahn's deterrent proposals, especially those designed for type II deterrence, and it is clear that his case for civil (as well as active, anti-missile, etc.) defense is equally compelling. The real question, however, is whether one can advocate a type II deterrent, relying heavily as it does upon counter-force and civil defense measures, without seriously jeopardizing one's type I (direct attack) deterrent. I will argue that this is extremely improbable, and that by adhering to the type II deterrent strategy he recommends we must seriously jeopardize the success of our deterrent of type I. Why should this be so?

Basically, what Kahn is proposing is a highly asymmetrical set of operational codes. He wants us to engage in the sort of behavior which is supposed to deter the U.S.S.R., but which, if employed by them, would almost certainly compel us to opt for a pre-emptive strike. For example, in a crisis situation, he would have the United States engage in one or more of the following acts (pp. 211-5):

1. Put bombers and missiles on maximum alert.¹¹

¹¹ Elsewhere (p. 528) he recognizes the unsettling effect of this, and suggests that "the main destabilizing effect of type II deterrence can be

2. Evacuate civilian population.
3. Jam and spoof the other's warning nets.

Without going into a detailed "scenario" (a wonderful word used by strategists in describing their speculative fantasies), it would seem perfectly evident that any one of these acts would produce an extremely high probability of the other's deciding to pre-empt.

More important, both the counter-force capability and the civil defense system convey an overwhelming impression of first-strike, rather than retaliatory, *intentions*. If one's strategy is purely one of deterrence, and the deterrent is supposed to be a function of certain retribution and punishment, why shoot for inanimate missile pads or air bases, especially if they will have done their job before being hit? Moreover, of what use is a large scale evacuation or shelter program if you are resigned to accepting the first blow? A counter-force capability is very handy for a preventive or pre-emptive strike, but almost useless for a retaliatory one. Likewise, civil defense is fine if you have time to evacuate and shelter your population while *your* strike is on the way and if the retaliatory blow may not come for several hours. In other words, to acquire these two capabilities is to generate in the minds of Soviet strategists a high degree of fear, coupled with a rising expectation of surprise attack (13,14). The record of folly that is man's political history is replete with illustrations of the results of such perceptions, as is the literature of psychological research. Does an adversary of approximate parity back down and surrender in face of such ominous threats, or does he decide on getting in the first of what has come to look

handled in part by not keeping the first strike forces on alert." Thus, he is again confronted with a dilemma: if you want the threat to be credible, you have to be provocative, and if you don't want to be provocative, you can't make it credible.

like an inevitable exchange of strikes? Unhappily, we can only analogize and speculate on this, as any empirical evidence would be a bit too dramatic, but I would argue strongly for the likelihood of pre-emption.

Instead of going for counter-force and civil defense, I would suggest that we do exactly the opposite. Since Kahn himself recognizes the destabilizing characteristics of his credible first-strike posture, would he not attribute equal perspicacity to the White House and the Kremlin? Why not press the Soviets for an agreement—easily inspectable—banning the institution of any civil defense construction? He intimates that the Soviets already have begun a large-scale program of training and construction, but produces not a shred of evidence. And despite the asymmetry of present target intelligence, and the greater technical difficulties, why not propose a ban on the further acquisition of counter-force type target information? Despite the impending functioning of Samos, Midas, and other surveillance satellites, there may still be time to seek a ban on their use for ground target (launch site) acquisition. These devices might rather be assigned to the United Nations and so instrumented as to be useful for surprise attack warning only, but not for target location. Furthermore, there still seems to be plenty of time to institute a ban on tracking missile-firing submarines, though the technology of this may be even more elusive. I hope that Kahn and his Rand colleagues—if these notions make sense—will address themselves to the problems inherent in such an approach.¹²

¹² Some other points of possible vulnerability in preventing the development of a counter-force capability might be in keeping charts and guidance systems inaccurate, or limiting the yield in warheads. Another technique for reducing the Soviet expectation of surprise attack might be to dismantle our "soft" close-in IRBM sites—even before Atlas and Titan are operational and deployed.

Of course, my criticism of counter-force and civil defense as constituting a first-strike image is exactly where our disagreement arises. The author considers such visible capabilities as advantageous, and I consider them disadvantageous. The problem is that we employ different criteria of advantage. If we use a minimize-the-probability-of-nuclear-war criterion, both of us agree that such a capability is destabilizing and provocative. And if we use a don't-let-the-enemy-bluff-us criterion, we again agree that it would be useful. But it strikes me as utterly absurd to employ the latter criterion if—as both of us concur—it clashes with a prevent-the-war criterion.¹³

The point is that we cannot have the best of both possible worlds, and must decide which disutilities are most awful to contemplate and therefore which probabilities we want to minimize. Apparently Mr. Kahn dislikes the possibility of an occasional Soviet diplomatic victory more than he dislikes the possibility of nuclear war, while I would—given these two alternatives—opt for the other; the beauty of our probability-utility model is that it makes these preferences painfully clear. However, these are not our only two choices, and it seems perfectly possible that we can negotiate and deal and bargain successfully with the adversary without keeping one finger constantly on the mutual mayhem button.

¹³ That Kahn himself is aware of the possibility of non-reconcilable demands is indicated in a section called "The Conflicting Objectives" (pp. 531-9), but he never really wrestles with the dilemmas posed, despite a consideration of alternatives to a credible first-strike capability (pp. 539-50). This is another of the many examples of the book's basic inconsistency: his main thrust is on behalf of developing this capability, but he then covers himself by suggesting that it may not do all the things he claimed for it earlier in the study.

Conclusions

Reviewing this book has been a most frustrating experience. Granted, the subject matter is extraordinarily complicated and demands a great deal of speculation. But the author has made it even more complicated than it need be, by arranging the book in an unbelievably whimsical and capricious fashion. And the "tables," normally used to *clarify* an author's ideas, require considerable ingenuity and clairvoyance before becoming coherent; they do, however, because there are so many, serve as a rough substitute for an index, whose lack is particularly noticeable in a book of such discursiveness and chaos.¹⁴ But these are peripheral objections.

My major criticism concerns the substance of Mr. Kahn's recommendations. He calls for an invulnerable strike-back capability to deter direct aggression, but then says that "firing it would result in self-destruction" (p. 526). He demands a counter-force capability to demonstrate our ability to fight as well as deter war, but concludes that this is insufficient. Next he insists on a credible first-strike capability to cope with crises, but admits that it may "destabilize type I deterrence" (p. 527). He urges an active air defense capability, but acknowledges that "defense against attack was hard even before the missile age" (p. 100). He presses for passive defense only to recognize that its deterrent effect is so small "that it seems proper to ignore it" (p. 115), and that it may

¹⁴ At first, I was surprised that Klaus Knorr, in his foreword, commends Kahn's "masterly command of method" and his "step-by-step presentation." But then we are reminded that the book was written at Princeton's Center of International Studies, giving Professor Knorr many months of contact with the author and his mode of expression. And even then, he does refer to the fact that these "lectures in book form" have retained "some of the informality of the original presentation." A gracious understatement!

do no more than keep casualties well below 160 million (p. 113). He finds arms control increasingly essential, as an alternative to an "uncontrolled situation [which] . . . involves greater risks" (p. 537), but would "enforce" it by retaining "a credible capability to initiate thermonuclear war" (p. 241). And finally, he recognizes that "even a poor world government might be preferable to an uncontrolled arms race" (p. 7) but implies that its advocates go in for "hysteria . . . excessive accommodation, or unilateral disarmament" (p. 527).

In short, despite many brilliant insights and delightfully sophisticated analyses, the study is laden with inconsistency and is lacking in strategic coherence. Perhaps this must be true of all solutions which are essentially military in nature. It may well be that we and the Soviets are enmeshed in that fabled "prisoner's dilemma," in which the "rational" strategy of each produces a cataclysm fatal to both. Moreover, it is certain that we will not escape the dilemma if we build our strategies on self-fulfilling prophecies.

If Kahn is serious about deterring nuclear war, let him accept a higher disutility if it comes. If he is serious about arms control (and he discusses it often and incisively) let him eschew the postures that will inhibit it. And if he is serious about disarmament, let him begin to study *its* problems. Now that this valuable analysis is completed, I hope that he and his Rand colleagues (and ORO, IDA, and the rest) will get down to an even more difficult, but far more promising, research undertaking: that of converting the international system from one of armed instability to one of disarmed order, where nations can settle their quarrels like tough-minded businessmen rather than ruthless hoodlums. It won't be a Utopia, but neither will it be an Inferno.

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