

**THE NATURE AND FEASIBILITY
OF WAR AND DETERRENCE**

Herman Kahn

Physics Division

P-1888-RC

January 20, 1960

(Second Printing April, 1960)

THE RAND CORPORATION

Santa Monica, California

NOTE

This paper is a slightly enlarged and revised version of an article of the same title published in the Stanford Research Institute *Journal* for the fourth quarter of 1959. It summarizes some of the points discussed in a forthcoming book by Mr. Kahn to be published by the Princeton University Press in 1960. It was written as a private venture while the author was on leave from The RAND Corporation at the Center of International Studies, Princeton University. An abbreviated version of the SRI article was printed in *U.S. News and World Report*, December 21, 1959.

While this paper is published by The RAND Corporation as a convenience to the author and to fill the requests of the many groups to which he has lectured on this topic, the views expressed are solely those of the author and do not necessarily reflect the views of the Corporation.

THE NATURE AND FEASIBILITY OF WAR AND DETERRENCE*

* * *

"A nuclear war is too horrible to contemplate, too mutually annihilating to consider." Even if both sides believe this, a potential aggressor still has a capability of staging an unlimited number of "Munichs." For only one side to believe this, whether correctly or not, might lead to the most catastrophic mistake of history—to either a Pearl Harbor or an Armageddon.

We are now entering the fifteenth year of the nuclear era. Yet we are increasingly aware that we have a great deal to learn about the possible effects of a nuclear war. We have even more to learn about conducting international relations in a world in which force tends to be increasingly more dangerous to use and therefore increasingly less usable. Moreover, the basic foreign and defense policies formulated early in the nuclear era badly need review and examination.

*This paper summarizes, sometimes rather cursorily, some of the points discussed by the author in a forthcoming book, *Thermonuclear War: Three Lectures and Several Suggestions*, to be published by the Princeton University Press late in 1960.

Possibly of first importance is the casting of doubt on the widely accepted theory that the very existence of nuclear weapons creates a reliable balance of terror. This theory commonly holds that a thermonuclear war would mean certain and automatic annihilation of both antagonists, perhaps even the end of civilization. This concept of certain "mutual homicide" has been comforting to some. It makes plausible the widely held conviction that as soon as governments are informed of the terrible consequences of a nuclear war, their leaders will realize that there can be no victors and, therefore, no sense to such a war. No sane leader would ever start one! According to this view, the very violence of nuclear war will act to deter it.

The mutual-homicide theory has other comforting aspects. If it be granted that each side can utterly destroy the other, then expensive preparations to reduce casualties, lessen damage, and facilitate postwar recuperation are useless. Can we not spare ourselves the financial burden of such preparations? Such logic has sometimes been carried further, for some have argued that modern weapons are so enormously destructive that only a few are needed to deter the enemy. Thus war can be deterred with much smaller forces than in the past; in any case, we certainly don't need larger ones.

Many proponents of this mutual-annihilation view believe that it is important to emphasize the horror and impracticability of thermonuclear war. To do so will show that the need to settle our differences by peaceful means is urgent. Temptation will be removed from adventurers. It is clear that in order to

achieve success with such a psychological program it is necessary that the fears thus generated be mutual and reliable. To paraphrase a remark made by Jacob Viner, As a defense against aggression, fear—like fertilizer—must be spread evenly to be effective.

The mutual-homicide theory can be successful in forestalling an all-out nuclear attack only if both sides completely accept it. If only the West believes in it (and because of this belief drops its guard), the resulting negligence can be incredibly dangerous. Even mutual belief in the automatic-annihilation theory can still lead to trouble; the invitation to blackmail of the Munich type is still open. It is easy to see that to the extent that the theory may not be true—or that the Communists think it isn't—we should not weaken ourselves to the point where we court "Pearl Harbors" or "Munichs."

The mutual-annihilation view is not unique to the West. Malenkov introduced it to the Soviet Union several years ago, apparently arguing in the now-classical fashion that with nuclear war entailing the end of civilization, the capitalists would not attack; the Soviet Union, he said, could afford to reduce investment in heavy industry and military products and concentrate on consumer goods. A different view seems to have been held by Khrushchev and the Soviet military. They agreed that war would be horrible, but at the same time they argued that this was no reason for the Soviet Union to drop its guard: given sufficient preparations, only the capitalists would be destroyed. With some modifications their views seem to have prevailed.

WAR AND DETERRENCE IN 1960

Much depends, therefore, on the validity of this notion of the balance of terror. Is it really true? Would only an insane man initiate a thermonuclear war? Is war, at least of the thermonuclear variety, completely obsolete? Or are there circumstances in which a nation's leaders might rationally decide that a thermonuclear war would be the least undesirable of the possible alternatives?

It should be clear that if either the Soviets or the Americans ever become careless in the operation of their alert forces, it is conceivable that a war might start as a result of an accident, some miscalculation, or even irresponsible behavior. But the situation seems worse than this, for one can conclude that with current technology there are plausible circumstances in which leaders might decide that war was their best alternative. To recognize such possibilities is certainly not to endorse them.

To support this assertion about the "feasibility" of thermonuclear war, it is necessary to describe and evaluate the impact of a thermonuclear war and to describe the kinds of risks that might cause decisionmakers to weigh the alternatives of going to war and not going to war. The various phases to be considered in doing this are—

1. Various phased programs for deterrence and defense for the United States, allies, and neutrals.
2. Wartime performance of the total system under different preattack and attack conditions.
3. The acute fallout problems.

4. Survival and patchup.
5. Maintenance of economic momentum.
6. Long-term recuperation.
7. Postwar medical problems.
8. Genetic problems.

Because many are particularly concerned over the last three items, we will start with them.*

GENETIC EFFECTS OF THERMONUCLEAR WAR

Many biologists and geneticists are worried about the genetic effects of even the peacetime testing of nuclear weapons, and some imply that the future of the human race is being jeopardized by exploding a few bombs in the Pacific Ocean or the Soviet Arctic. One must grant that a lot of bombs exploded inside a country would be far more dangerous than a few exploded farther away. But would it be cataclysmic?

Calculations in this field are inherently uncertain, and experimental evidence is insufficient to be conclusive about some important effects. One study indicates that if, in a country that was hit by hundreds of bombs, the survivors of the attack took modest precautions they might average about 200 or 300 roentgens of radiation to their reproductive organs before age thirty. This is an enormous amount of radiation—one or two thousand times as much as people in the United States would receive as

*A systematic discussion of the eight phases of a thermonuclear war can be found in *A Report on a Study of Non-Military Defense*, The RAND Corporation, Report R-322-RC, July 1, 1958.

a by-product of the test program. It is fifty to a hundred times as much as they would normally get from natural sources. It is a large and frightening dose. It would result in much damage, but there is no evidence that it would be annihilating.

If present beliefs are correct, the most serious genetic effect of this amount of radiation would be to raise by 25 per cent the number of children born seriously defective; that is, the rate would increase from the current 4 per cent of the total to a new level of 5 per cent. This is a high penalty to pay for a war, and more horrible still, one might have to continue to pay a similar though smaller price for twenty or thirty or forty generations. But it is still far from annihilation. This particular aspect of a war can be looked on as an intensification and amplification of the kinds of burdens we already bear in peacetime. Whether this extra horror of war will deter a nation from going to war depends on the pressures under which it labors and the alternatives it has.

MEDICAL PROBLEMS

There are medical problems other than the genetic ones: the bone cancers and leukemias that might be caused by strontium-90 and the other life-shortening effects of the internal and external radiation from fission products. Here again, analysis indicates that while the problems are horrible, they may well be within the range to which we are accustomed. For example, it is possible—as some scientists have claimed—that as a result of testing a large-yield bomb, unknown thousands of

people will get bone cancer or leukemia. The true extent (or whether the claim is true at all) is simply not known. In any case, acceptance of this concept leads many to think that if a few bombs in the distant Pacific or Arctic could cause this much trouble, a larger number of bombs closer to home would be totally catastrophic. Some military experts even assert that the so-called backlash fallout from the attacker's own bombs will be an automatic deterrent. Would that the problem of deterrence could be solved so easily!

The situation devolves to this: Even if it were true that every time a megaton explodes a thousand people die prematurely from the effects of the worldwide fallout—which would mean that testing a single 10-MT bomb in the Pacific would kill 10,000 people—this does not necessarily mean that the backlash from war would deter a determined decisionmaker. Assume, for example, that the Soviets dropped 5000 MT on the United States (a fairly large attack). This would mean that worldwide, 5 million people would die just as a result of the backlash. Less than half a million of these deaths would occur in the Soviet Union, however, and even those half million deaths would be spread over fifty years or so. The impact of these deaths would be less significant than, say, that of the annual number of deaths due to automobile accidents in the United States. So far as the object of the attack—the United States—is concerned, the effect of the fallout would be much more serious, but it might not be a total catastrophe. More and closer bombs cause more trouble than fewer and more distant ones—but not necessarily that much more. If the country is hit as hard as is

assumed, but people take advantage of the moderate protection that is available in existing buildings and take other simple measures (that is, do things that the Russians today seem to be doing or thinking of doing), both the long- and short-term effects of fallout are mitigated. With such preparations and some advance warning (the more preparation, the less need for warning) *most people can survive the short-term fallout effects even though the long-term effects are less avoidable.* The war might shorten by one or two years the life expectancy of those who were lucky or protected, and by five or ten years the life expectancy of those survivors who were not so lucky or well protected. In any case, life would go on.

ECONOMIC RECUPERATION

Economic recuperation also looks more feasible than is generally supposed. Most people—laymen and some experts—looking at the highly integrated character of a modern economy, argue that a nation is like a body: destroy the heart or other vital organs, and even though a few cells may linger briefly, the body dies.

This view is questionable. Suppose the United States or the Soviet Union were to be divided into two countries—an A country with the largest 50 to 100 cities, and a B country, the remainder. The A country cannot survive without the B country; but the B country, so far as we can see, can survive without the A country. Moreover, we estimate that B has the resources and skills needed to rebuild A in, say, ten years.

In other words, a country should not be considered analogous to a body with vital irreplaceable organs, but rather should be considered as two semi-independent pieces that trade with each other.

To continue the point, in most parts of the country it seems to be possible, by using existing construction and otherwise improvising fallout protection, to prepare the B country to receive evacuees from the A country and protect them in a reasonably satisfactory manner. If preparations have been made, then for most of the year fallout protection could be improvised on only a few days' or hours' notice. In the wintertime both the United States and the Soviet Union might need more time or better preparation.

Russian Civil Defense manuals (dated 1958) indicate that the Soviets are making such preparations. In addition, the Russians claim to have given every adult in Russia between 20 and 40 hours of instruction in civil defense, followed by a compulsory examination. Perhaps most important of all, their program seems to include preparations for evacuation to improvised fallout protection. How effective would such an evacuation be?

* * *

About 50 million Russians live in the 135 largest Soviet cities. If they evacuated, say, 80 per cent of these 50 million to their B country and left the remainder to operate the cities, all essential functions could be maintained while exposing only

about 10 million citizens. Also, having evacuated most of the urban population, it would be comparatively easy to evacuate those remaining. So long as our ICBM force is small, the Soviets wouldn't even have to execute the evacuation before they launched an attack, since they would have time to do so before our retaliatory force reached the majority of their cities.

Under these circumstances, if the Russians should strike first and were reasonably successful, our retaliation attack would not kill more than 5 or 10 million Russians and probably considerably fewer—unless things went incredibly badly for them. Thus they might lose only a fraction as many people as they lost in World War II.

In a particularly tense situation the Soviets could deliberately evacuate their A country in order to put pressure on us. Such an evacuation would make it credible that they might go to war unless we backed down. While this would give us a sort of warning, we might not act on it. We might refuse resolutely to be "bluffed." Unless we were willing to accept a Soviet retaliatory blow, the only practicable counteraction that we might have might be to back down or to put our Strategic Air Command on alert and hope that this action would be enough to deter them. The other possibility—to assume that they didn't mean what they seemed to mean—might be too risky. If we wished to be in a good bargaining position we would probably have to evacuate our own cities. (We have made almost no realistic preparations for such a step.)

Evacuation-type maneuvers are risky because they may touch off an attack by the other side. But so far as the Soviets are

concerned the probability of such an attack by us is small, particularly because we have made negligible preparations to ward off, survive, and recover from even a "small" Soviet retaliatory strike. They might accept the risk of attack. They would then be in a relatively good position to go to war if we didn't attack or back down. Thus the Soviets could start such a war in any circumstances in which Khrushchev finds the risks of not going to war larger than those of going to war.

Consider the bloody suppression of the Hungarian revolution by the Soviets. Much pressure was applied for the United States to intervene. We didn't. In fact, there are reports that we did exactly the opposite, broadcasting to the Poles and the East Germans not to rock the boat since no American aid was on the way. Assume that we had acceded to intervention pressure on that occasion. The Russians would then have been faced with three fairly serious choices:

1. They could do nothing. This could mean an almost automatic Polish and East German revolt. Such a revolt would mean serious political repercussions within Russia.
2. They could fight a limited action. But that would bring its own risks. The satellites might still revolt. In addition, if we fought a limited action with conventional high-explosive weapons, we might lose just by sheer weight of numbers. If we went to atomic weapons, it is doubtful that we would win and even more doubtful that the war would stay limited. The Soviets might easily believe that we were quite capable of suddenly expanding the scope of the war with a surprise attack against their strategic forces.

3. The third possibility might appear safer to the Soviets. Rather than wait for the satellites to revolt or for the limited war to erupt into a general war at a time chosen by the Americans, they might decide to hit us right away. They could argue that this guaranteed them the all-important first strike, at least if they hurried.

It is possible that a situation as potentially dangerous as the Hungarian revolt could arise again. We could get deeply, if involuntarily involved. Consider, for example, an East German revolt in which a rearmed West Germany felt obligated to intervene, or an all-out U.S.-Chinese war. If either of these events happen, our retaliatory capability must be so good that even if the Soviets evacuate their cities they will feel that a strike by them would be more risky than accepting whatever alternative seems to be in store. While I do not have space to discuss the difficulties of achieving this capability in the 1960-70 period, it is harder to accomplish than many suppose.

DAMAGE VERSUS COMMITMENTS

Even if one accepts the balance-of-terror theory and we don't have to worry about a deliberate Soviet attack on the United States, we are still faced with important strategic problems. In 1914 and 1939 it was the British who declared war, not the Germans. Such a circumstance might arise again; but if the balance of terror were reliable, then we would be as likely to be deterred from striking the Soviets as they would be from striking us, and it would be doubtful that the United States

would resort to an all-out attack on the Soviets, even to correct or avenge, for example, a major Soviet aggression limited to Europe.

That this now is plausible can be seen by Christian Herter's response on the occasion of the hearings on his nomination: "I cannot conceive of any President involving us in an all-out nuclear war unless the facts showed clearly we are in danger of all-out devastation ourselves, *or that actual moves have been made toward devastating ourselves.*"*

A thermonuclear balance of terror is equivalent to signing a non-aggression treaty that neither the Soviets nor the Americans will initiate an all-out attack—no matter how provoking the other side may become. Sometimes people do not understand the full implications of this figurative non-aggression treaty. Let me illustrate what it can mean if we accept absolutely the notion that there is no provocation that would cause us to strike the Soviets other than an immediately impending or an actual Soviet attack on the United States. Imagine that the Soviets have taken a very drastic action. I don't care how extreme or shocking you imagine it to be. Suppose, for example, that they have dropped bombs on London, Berlin, Rome, Paris, and Bonn but have made no detectable preparations for attacking

*Whether he means it or not, Khrushchev speaks a different language. On January 14, 1960, in a speech to the Supreme Soviet, he said: "I am emphasizing once more that we already possess so many nuclear weapons, both atomic and hydrogen, and the necessary rockets for sending these weapons to the territory of a potential aggressor, that should any madman launch an attack on our state or on other Socialist states we would be able literally to wipe the country or countries which attack us off the face of the earth."

the United States, and that our retaliatory force looks good enough to deter them from such an attack. Suppose also that there is a device that restrains the President of the United States from acting for about 24 hours. The President would presumably call together his advisers during this time. Most of these advisers would probably urge strongly that the United States fulfill its obligation and strike the Soviets. (After all, you have to draw a line somewhere, and the Soviets have obviously more than crossed this line.) Now let us further suppose that the President is also told by his advisers that even though we will kill almost every Russian if we strike the Soviets, we will not be able to destroy all of the Soviet strategic forces, and that these surviving Soviet forces will (by radiation, or strontium-90, or something) kill every American in their retaliatory blow.

I find it difficult to believe that under these circumstances any President of the United States would initiate a thermo-nuclear war by retaliating against the Soviets with the Strategic Air Command. There is no objective of public policy that would justify ending life for everyone. It should be clear that we would not restore Europe by our retaliation; we could only succeed in further destroying it, either as a by-product of our actions or because the Soviets would destroy Europe as well as the United States.

There were two important caveats in the situation described: the President would have 24 hours to think about his response, and 177 million Americans would be killed. Let us consider the latter first. If 177 million dead is too high a price to pay for

punishing the Soviets for their original aggression, how many American dead would we accept as the cost of our retaliation? I have discussed this question with many Americans, and after about 15 minutes of discussion their estimates of an acceptable price generally fall between 10 and 60 million dead. (Their temporary first reaction, incidentally, usually is that the United States would never be deterred from living up to its obligations by fear of a Soviet counterblow, an attitude that invariably disappears after some minutes of reflection.) The way one seems to arrive at the 60 million figure is rather interesting. One takes about one-third of a country's population, or just a little less than half. No American that I have spoken to who was at all serious about the matter believed that U.S. retaliation would be justified—no matter what our commitments were—if more than half of our population would be killed.

The 24-hour delay is a more subtle device. It is the equivalent of asking, Can the Soviets force the President to act in cold blood, rather than in the immediate anger of the moment? The answer depends not only on the time he has to ponder the effects that would accrue from his actions, but also on how deeply and seriously the President and his advisers had thought about the problem in advance. This latter, in turn, could depend on whether there had been any tense situations or crises that forced the President and the people to face the concept that war is something that can happen, rather than something that is reliably deterred by some declaratory policy that is never acted on. (The effects of the war are usually considered

irrelevant to the declaratory policy, since it is assumed that the policy will deter the war.)

I have discussed with many Europeans the question of how many casualties Americans would be willing to envisage and still live up to their obligations. Their estimates, perhaps not surprisingly, range much lower than the estimates of Americans—that is, roughly 2 to 20 million. In fact, one distinguished European expert thought that the United States would be deterred from retaliating with the Strategic Air Command against a major Soviet aggression in Europe by a Soviet threat to destroy 5 to 10 empty U.S. cities.

Will the Soviets find the threat of U.S. retaliation credible? I have not asked any Soviet citizen, so I lack the advantage of any introspection. But we do know a great deal about Soviet decisionmakers; in particular, we know that they strongly emphasize that decisionmakers should be able to control their emotions. They probably would assume that we feel the same way. The Soviets do not believe in cutting off their noses to spite their faces. They write and seem to believe that one should not be provoked into self-destructive behavior. Thus it is hard for me to visualize the Soviets' believing that the United States would willingly commit suicide. In fact, I would conjecture that they would feel fairly certain about this matter. They could still be wrong. In the United States, there is no tradition of controlling one's emotions. We have tended to emphasize the opposite notion ("Give me liberty or give me death!") and if the Soviets are cautious they will realize this. However, if the Soviets were to test our resolve by instigating a series of crises,

they could probably find out experimentally, without running excessive risks, how much provocation we would take. No matter what our previously declared policy was, our actual policy and the possibilities would then be verified by the Soviets. Most important of all in the war of nerves, it is difficult to believe that the Europeans would have faith in our adherence to declared policy if it were strained; basically, the problem is to convince the Europeans if we wish to prevent appeasement as well as destruction.

Published unclassified estimates of the casualties that the United States would suffer in a nuclear war generally run from 50 to 60 million. If these estimates are relevant (which is doubtful, since they generally assume a Soviet surprise attack on an unalert United States), we are already deterred from living up to our alliance obligations. If they are not relevant, we ought to make relevant estimates for now and the future.

The critical point is whether the Soviets and the Europeans believe that we can keep our casualties to a level we would find acceptable, whatever that level may be. In such an eventuality the Soviets would be deterred from very provocative acts such as a ground attack on Europe, Hitler-type blackmail threats, or even evacuating their cities and presenting us with an ultimatum. But if they do not believe that we can keep casualties to a level we would find acceptable, the Soviets may feel safe in undertaking these extremely provocative adventures. Or at least the Europeans may believe that the Soviets will feel safe, and this in itself creates an extremely dangerous situation for pressure and blackmail.

THE THREE KINDS OF DETERRENCE

It is important to distinguish between three types of deterrence: *Type 1 Deterrence* (which the British call "passive deterrence" on the plausible, but possibly incorrect, assumption that it requires no act of will to respond to a violation) is the deterrence of a direct attack. It is widely believed that if the United States were directly attacked, its response would be automatic and unthinking. *Type 2 Deterrence* (which the British have called "active deterrence" because it clearly takes an act of will to initiate) is defined as using strategic threats to deter an enemy from engaging in very provocative acts other than a direct attack on the United States itself. *Type 3 Deterrence* might be called "*tit-for-tat* deterrence." It refers to those acts that are deterred because the potential aggressor is afraid that the defender or others will then take limited actions, military or nonmilitary, that will make the aggression unprofitable. These three types of deterrence will be discussed in turn at length.

Type 1 Deterrence (Deterrence against a Direct Attack)

Most experts today argue that we must make this particular type of deterrence work, that we simply cannot face the possibility of a failure. Never have the stakes on success or failure of prevention been so high. Although the extreme view that deterrence is everything and that alleviation is hopeless is

questionable, clearly Type 1 Deterrence must have first priority.

In spite of the many words lavished on Type 1 Deterrence, most discussions of the conditions needed for such deterrence tend to be unrealistic. Typically, discussions of the capability of the United States to deter a direct attack compare the preattack inventory of our forces with the preattack inventory of the Russian forces—that is, the number of planes, missiles, army divisions, and submarines of the two countries are directly compared. This is a World War I and World War II approach.

The really essential numbers, however, are estimates of the damage that the retaliatory forces can inflict after being hit. Evaluation must take into account that the Russians could strike *at a time and with tactics of their choosing*. We strike back with a *damaged* and perhaps *uncoordinated* force, which must conduct its operations in the *postattack environment*. The Soviets may use *blackmail* threats to intimidate our response. The Russian defense is completely *alerted*. If the strike has been preceded by a tense period, their active defense forces have been *augmented* and their cities have been at least partially *evacuated*. Any of the emphasized words can be very important, but almost all of them are ignored in most discussions of Type 1 Deterrence.

The first step in this calculation—analysis of the effects of the Russian strike on U.S. retaliatory ability—depends critically on the enemy's tactics and capabilities. The question of warning is generally uppermost. Analyses of the effect of the enemy's first strike often neglect the most important part of the problem by assuming that warning will be effective and that our forces

get off the ground and are sent on their way to their targets. Actually, without effective warning, attrition on the ground can be much more important than attrition in the air. The enemy may not only use tactics that limit our warning, but he may do other things to counter our defensive measures, such as interfering with command and control arrangements. Thus it is important in evaluating enemy capabilities to look not only at the tactics that past history and standard assumptions lead us to expect, but also at any other tactics that a clever enemy might use. We should not always assume what Albert Wohlstetter has called "U.S. preferred attacks" in estimating the performance of our system. We should also look at "S.U. preferred attacks"—a sensible Soviet planner may prefer them!

The enemy, by choosing the timing of an attack, has several factors in his favor. He can select a *time* calculated to force our manned-bomber force to retaliate in the daytime, when his day fighters and his air-defense systems will be much more effective. In addition, he can choose the *season* so that his postwar agricultural problems and fallout-protection problems will be less difficult.

The second part of the calculation—consequences of the lack of coordination of the surviving U.S. forces—depends greatly on our tactics and the flexibility of our plans. If, for example, our offensive force is assigned a large target system so that it is spread thinly, and if because of a large or successful Russian attack the Russians have succeeded in destroying much of our force, many important Russian targets would go unattacked. If, on the other hand, to avoid this we

double or triple the assignment to important targets, we might over-destroy many targets, especially if the Soviets had not struck us successfully. For this and other reasons, it would be wise to evaluate the damage and then retarget the surviving forces. Whether this can be done depends critically on the timing of the attack, the nature of the targeting process, and our postattack capability for evaluation, command, and control.

Our attack may also be degraded because of problems of grouping, timing, and refueling; in some instances our manned bombers might be forced to infiltrate in small groups into Soviet air territory and lose the advantage of saturation of the Soviet defenses. Whether or not this would be disastrous depends a great deal on the quality of the Russian air-defense system, especially on whether it has any holes we can exploit, and the kind and number of penetration aids we use. This aspect is complicated and classified.

Another point that may be of great importance is that modern nuclear weapons are so powerful that even if they don't destroy their target, they may change the environment so as to cause the retaliating weapon system to be inoperable. The various effects of nuclear weapons include blast, thermal radiation, ground shock, debris, dust, and ionizing radiation—any of which may affect people, equipment, propagation of electromagnetic signals, etc. One might say that the problem of operating in a postattack environment after training in the peacetime environment is similar to training at the equator and then moving a major but incomplete part (that is, a damaged system) to the arctic and expecting this incomplete

system to work efficiently the first time it is tried. This is particularly implausible if, as is often true, the intact system is barely operable at the equator (that is, in peacetime).

In addition to attacking the system, the enemy may attempt to attack our resolve. Imagine, for example, that we had a pure Polaris system invulnerable to an all-out simultaneous enemy attack (invulnerable by assumption and not by analysis) and the enemy started to destroy our submarines one at a time at sea. Suppose an American President were told that if we started an all-out war in retaliation, the Soviets could and would destroy every American because of limitations in our offense and our active and passive defenses. Now if the President has a chance to think about the problem, he simply cannot initiate this kind of war even with such provocation. Against even stronger strategic postures there will still be opportunities for using postattack coercion. In some cases it will cost the Soviets nothing to use tactics combined with threats which, if they work, will greatly alleviate their military problems; if they do not work, the situation will be almost unchanged anyway. I do not have the space here to discuss the timing, control, communication, and persuasion problems involved in making different kinds of postattack coercion feasible, but they do not look insurmountable.

One of the most important and yet the most neglected elements of the retaliatory calculation is the effect of the Russian civil-defense measures. The Russians are seldom credited with even modest preparedness in civil defense. Analysts sometimes go so far as to assume that peacetime civilian activities will

continue on a business-as-usual basis, hours after Russian missiles or planes have been dispatched. The analysts may then proceed to worry about conventional day-night variations in population. This is not only ridiculous, it is also symptomatic of the lack of realism and the prevalent tendency toward underestimating the enemy.

A much more reasonable alternative that would apply in many situations—that the Russians might at some point evacuate their city population to places affording existing or improvisable fallout protection—is almost never realistically examined. If the Russians should take steps to evacuate their cities, the vulnerability of their population would be dramatically reduced.

The Soviets also know that they can take an enormous amount of economic damage and be set back only a few years in their development. Not only did they do something like this after World War II, but what is even more impressive, they fought a war *after* the Germans had destroyed most of their existing military power and occupied an area that contained about 40 per cent of the prewar Soviet population—the most industrialized 40 per cent. According to Soviet estimates, by the time the war ended they had lost about one-third of their wealth—almost the proportion we would lose if we lost all of the A country. The Soviets rebuilt the destroyed wealth in about six years. Moreover, since 1931 they have had a vigorous program to disperse their industry, a program that seems to have been stepped up since World War II. It is quite likely that their B country is at least as capable of restoring

society as ours. Much more important, they probably *know* the capabilities of their B country.

The difficulties of Type 1 Deterrence arise mainly from the fact that the deterring nation must strike second. These difficulties are compounded by the rapidity with which the technology of war changes and the special difficulty the defender has in reacting quickly and adequately to changes in the offense. The so-called missile gap illustrates the problem. The Russians announced in August, 1957, that they had tested an ICBM. Evidence of their technical ability to do this was furnished by Sputnik I, sent aloft in October of that year. Early in 1959 Khrushchev boasted that the Soviet Union had intercontinental rockets in serial production. We have little reason to believe that they won't have appreciable numbers of operational ICBM's about three years after their successful test—which would be in August, 1960.

Suppose that in 1957 and 1958 we had refused to react to this "hypothetical" threat, so that when the autumn of 1960 appeared we had not completed the needed modifications to our defenses to accommodate this development. What kind of risk would we have run?

I will assume (on the basis of newspaper reports and Congressional testimony) that we had approximately 25 *unalert* SAC *home* bases in 1957. In accordance with the proposed hypothesis of doing nothing, I will (incorrectly) assume that we still have 25 bases in 1960. The number of missiles that the Russians would need in order, hypothetically, to destroy these 25 SAC bases depends on their technology. Assume that their

missile has a probability of one in two of successfully completing its countdown and destroying the SAC base at which it is launched. What would we have risked? Simple calculation indicates that our risk would have been substantial. For example, if the Russians had 125 missiles, then even if their firing time were spread out over an hour or so, it would still be possible for Mr. Khrushchev's aides to push 125 buttons and expect that there would be a better than even chance that they would destroy all of the aircraft on the ground at SAC home bases, about one chance in three that only one such base would survive, and a very small probability that two or more bases would survive. The Soviets could well believe that their air defense would easily handle any attacks launched by aircraft from one or two bases. If they are prepared to accept the risk involved in facing an attack from, say, four or five bases, then they need only about 75 missiles, each with a single-shot probability of one-half; if they had 150 missiles, the single-shot probability could be as low as one-third and still be satisfactory to a Soviet planner willing to accept retaliation from four or five surviving bases.

This kind of missile attack is much more calculable than almost any other kind of attack. It is so calculable that many people believe that the results of such an attack can be predicted just by applying well-known principles of engineering and physics. It looks so calculable that even a cautious Soviet planner might believe that he could rely on the correctness of his estimates; thus he might find it the path of caution to attack while the opportunity was still available.

Actually, even with tested missiles, results of attacks are not really mathematically predictable. The probability of extreme variations in performance, the upper and lower limits, cannot be calculated accurately. But laymen or narrow professionals persist in regarding the matter as a simple problem in engineering and physics. Therefore, unless sophisticated objections on the possibilities of intelligence leaks, firing discipline, reliability of the basic data, field degradation, etc., are raised, even an inarticulate Russian general could probably force the following conclusions on a group of hostile, skeptical, and busy civilians, whether they wanted to believe them or not: that in this hypothetical case (where the Russians had 125 missiles, each with a single-shot probability of one-half), if they were to push these 125 buttons and also launch a supplementary coordinated attack with IRBM's and tactical bombers on U.S. and allied overseas bases, there would be a reasonable chance that the Soviet Union would get away scot free; that there would be a good chance that they would suffer very little damage; and that there would be no chance at all that they would suffer as much damage as they suffered in World War II.

Let us consider some of the caveats that this Russian general would have to concede if somebody raised them, and try to judge how serious Khrushchev or the Presidium would find them.

The first is that there be no intelligence leak. Given the small number of missiles involved and the tight security in the Russian empire, this might look like a reasonably safe assump-

tion. But whether the Russians would be willing to rely on our lack of intelligence is very hard to say. The Russians might think it possible for us to have a very senior spy or, even more worrisome, for them to have a defector—possibly in the Presidium itself.

The second caveat concerns firing discipline, that is, that nobody fires either prematurely or too late. If we work on our original assumption that the U.S. posture remains unchanged since 1957, when alerts were measured in hours or so, this is not a rigid requirement. However, if we give ourselves credit for a 15-minute alert, this would mean that the Russian missile is so reliable that when they press the buttons the majority of the missiles are actually ready to be fired. If the Russian missiles have a "hold" capability—that is, if they can be ready some minutes or hours early and then maintain this ready position, this may not be a difficult requirement, although it could decrease the effective reliability. (We are defining a missile's *reliability* here as including the probability that it takes off within a few minutes of the assigned firing time. Given that the Soviet missiles have a "hold" capability, this may not be a much smaller number than if we define reliability as the probability that the missile takes off within a few hours of the assigned firing time.) A small reduction in reliability would simply mean that the Russians would need a few more ICBM's. A large reduction would most likely put the Soviets out of business.

There is an interesting interaction between firing discipline and measures designed to reduce the possibility of intelligence

leaks. If the Soviets trained with very realistic exercises so that even the people involved in the exercises could not distinguish until the last minute the exercise from the real thing, then such exercises could be used to disguise preparations for attack. But there would be a tendency for somebody to fire prematurely, perhaps causing an accidental war. If, on the contrary, the Soviets try to prevent this breach of firing discipline by the use of severe threats and indoctrination so that nobody will fire prematurely, then they run the opposite risk that people will refuse to believe the order when it comes, unless alerted ahead of time.

The third caveat is that they must have accurate intelligence about the U.S. military posture. Given U.S. security practices currently in vogue about the position and use of our SAC bases and the ease with which information could be obtained about last minute changes, this also could look feasible. Probably the only requirement is to try to get the information.

Much more important, they need accurate data about themselves—the yield, accuracy, and reliability of their ICBM's, for example. While it is surprisingly hard to get reliable estimates of these quantities, only very sophisticated people will know this. If the Soviets have some extra margin of performance for insurance—that is, if they have a much better technological capability than they need—then they do not require extremely accurate estimates of this capability. On the other hand, if their equipment is just marginally satisfactory, then even though they have an adequate capability they are unlikely to know this.

Last and most important is the question of field degradation. Let us go back to our Russian general's persuasion problem. It is perfectly possible, for example, for this general to take the members of the Presidium out to the range and show them, say, 5 or 10 ICBM's lined up, and ask them to select one and make a cross on a map. The range personnel could proceed to fire that ICBM and hit near enough to the cross to make the general's point. Or even more convincingly, they might fire all 5 or 10 ICBM's at once.

This would be an impressive demonstration, but a question arises. What happens when the missiles are operated in the field by regular military personnel? While the Russians have a tradition of at least initial incompetency (for example, in the Crimean, Japanese, and Finnish wars, as well as in World Wars I and II), they have, since World War II, emphasized reliability of equipment, sometimes at the cost of other performance. One would assume that if they could obtain accuracy and yield at all, they could obtain it reliably. Nevertheless the worry might remain, How far off from range performance will we be?

It should also be noted that so long as our strategic bases are soft, missile attacks present the Russians with possibilities for the use of a postattack blackmail strategy almost as extreme as the one mentioned previously. If the Russians concentrate their attack solely against strategic bases and airburst their weapons (which is the most efficient way to use a weapon against a soft target), there will be no local fallout effects. Then unless one of the weapons goes astray and hits a major

city, deaths would be limited to a few million Americans as the result of blast and thermal effects. The Soviets could then point out (unless we had appreciable levels of air offense, air defense, and civil defense surviving) that they could totally *destroy* our country (while we could only *hurt* them), and did we really want to pick this moment to initiate the use of nuclear weapons against open cities?

While it would take a moderately reckless Soviet decision-maker to press the 125 ICBM buttons even if the assumptions were as favorable as originally hypothesized, it would be even more reckless for the United States to rely on extreme Soviet caution and responsibility as a defense. In any case, our Type I Deterrence can be strained, and in some moderately plausible situations even a cautious Soviet government might prefer pressing buttons if the odds were so much in its favor. The mere recognition by U.S. and European decisionmakers of the possibility of such an attack could dominate or distort all international relations.

The actual situation differs from this hypothetical one. As our newspapers report, we have taken many measures to alleviate this problem. It would not be appropriate to discuss here how adequate these measures are and the risks we may or may not be running. The measures we have adopted may or may not give us an adequate factor of safety. In any case it is necessary to react rapidly to changes in the enemy's posture.

The need for quick reaction to even "hypothetical" changes in the enemy's posture is likely to be true for the indefinite future, in spite of the popularity of the theory that once we

get over our current difficulties we will have a so-called minimum nuclear deterrent force that will solve the Type I Deterrence problem. Some even maintain that it will solve all strategic problems.

A last point will be made about Type 1 Deterrence. When people evaluate the quality of our Type 1 Deterrence they usually ask if it is sufficiently strong to prevent the Soviets from attacking us in cold blood. This is probably misleading. As I tried to point out when discussing the possible consequences of our intervening in Hungary, Type 1 Deterrence can be strained. Thus it is probably best to evaluate the quality of one's Type 1 Deterrence by asking how much strain it could accept and still be depended on. The next topic will indicate that plausible circumstances may arise in which we may wish to indulge in acts that would strain our Type 1 Deterrence.

Type 2 Deterrence (Deterrence of Extreme Provocations)

A quite different calculation is relevant to U.S. Type 2 Deterrence, although it is still a Soviet calculation (but this time a Soviet calculation of an American calculation). The Soviet planner asks himself, If I make this very provocative move, will the Americans strike us? Whether the Soviets then proceed with the contemplated provocation will be influenced by their estimate of the American calculation as to what happens if the tables are reversed. That is, what happens if the Americans strike and damage the Russian strategic air force, and the Russians strike back uncoordinated in the teeth of an alerted

U.S. air defense and possibly against an evacuated U.S. population? If this possibility is to be credible to the Soviets, it must be because they recognize that their own Type 1 Deterrence can fail. If Khrushchev is a convinced adherent of the balance-of-terror theory and does not believe that his Type 1 Deterrence can fail, then he may just go ahead with the provocative action.

It is important to realize that the operation of Type 2 Deterrence will involve the possibility that the United States will obtain the first strategic strike or some temporizing move, such as evacuation. Many people talk about the importance of having adequate civil and air defense to back our foreign policy. However, calculations made in evaluating the performance of a proposed civil- and air-defense program invariably assume a Russian surprise attack and—to make the problem even harder—a surprise attack directed mostly against civilians. This is unnecessarily pessimistic, for the calculation in which one looks at a U.S. first strike in retaliation for a Russian provocation is probably more relevant in trying to evaluate the role that the offense and defense play in affecting some important aspects of foreign policy.

Under this assumption, if we have even a moderate non-military defense program, its performance is likely to look impressive to the Russians and probably to most Europeans. For example, the crucial problem of obtaining adequate warning will have been greatly lessened, at least in the eyes of the Soviets. They are also likely to think that we have more freedom than we will have. The Soviets may believe that we are

not worried by the possibility that they will get strategic or premature tactical warning. This could be true in spite of the fact that in actual practice such an attack would probably involve a considerable risk that the Soviets would get some warning. Any planning would have to be tempered by the sobering realization that a disclosure or mistake could bring a pre-emptive Russian attack.

The possibility of augmenting our active and passive defense is very important. That is, rather than striking the Russians if they do something very provocative, we might prefer to evacuate our city population to fallout protection, "beef up" our air defense and air offense, and then tell the Russians that we had put ourselves into a much stronger position to initiate hostilities. After we had put ourselves in a position in which the Russian retaliatory strike would inflict much less than a total catastrophe, the Russians would have just three broad classes of alternatives:

1. To initiate some kind of strike.
2. To prolong the crisis, even though it would then be very credible that we would strike if they continued to provoke us.
3. To back down or compromise the crisis satisfactorily.

Hopefully the Soviets would end up preferring the third alternative, because our Type 1 Deterrence would make the first choice sufficiently unattractive and our Type 2 Deterrence would do the same for the second.

Type 3 Deterrence (Deterrence of Moderate Provocation)

The most obvious threat that we could muster under Type 3 Deterrence would be the capability to fight a limited war of some sort. Because this subject is complicated and space is limited, I will not discuss this particular Type 3 Deterrence capability—although it is important and necessary. Instead, I shall consider some of the nonmilitary gambits open to us.

Insofar as day-to-day activities are concerned, the things that seemingly regulate the other man's behavior are nonmilitary. For example, among other things, a potential provocation may be deterred by any of the following effects or reactions:

1. Internal reactions or costs
2. Loss of friends or antagonizing of neutrals
3. Creation or strengthening of hostile coalitions
4. Lowering of the reaction threshold of potential opponents
5. Diplomatic or economic retaliation
6. Moral or ethical inhibitions
7. An increase in the military capability of the potential opponent

Space permits discussion of only the last subject, which is both very important and badly neglected. It has become fashionable among the more sober military experts to regard mobilization capabilities as examples of wishful thinking. And indeed, in the few *hours* or few *days* of a modern war, large-scale production of military goods will not be possible.

PROVOCATION A SPUR TO MILITARY CAPABILITY

What deters the Russians from a series of Koreas and Indo-Chinas? It is probably less the fear of a direct U.S. attack with its current forces than the probability that the United States and her allies would greatly increase both their military strength and their resolve in response to such crises. The deterrent effect of this possibility can be increased by making explicit preparations so that we can increase our strength very rapidly whenever the other side provokes us. For example, in June, 1950, the United States was engaged in a great debate on whether the defense budget should be 14, 15, or 16 billion dollars. Along came Korea. Congress quickly authorized 60 billion dollars, an increase by a factor of four!

No matter what successes the Communist cause had in Korea, that authorization represents an enormous military defeat for the Soviets. However, it was almost three years before that authorization was fully translated into increased expenditures and corresponding military power. It is very valuable to be able to increase our defense expenditures, but this ability becomes many times more valuable if authorizations can be translated into military strength in a year or so. If the Russians know that deterioration in international relations will push us into a crash program, they may be much less willing to let international relations deteriorate. The problem is, Would we have time to put in a useful program? After all, the basic military posture (including installations) must be of the proper sort if it is to be possible to expand it within a year or so to

the point where it is prepared to fight a war in addition to being able to deter one. Our current posture (1960) is probably far from optimal for doing this.

If preparations like these were at least moderately expensive and very explicit, the Russians might find it credible that the United States would initiate and carry through such a program if they were provocative even, say, on the scale of Korea or less. The Russians would then be presented with the following three alternatives:

1. They could strike the United States before the buildup got very far. This might look very unattractive, especially since the buildup would almost certainly be accompanied by an increased alert and other measures to reduce the vulnerability of SAC.
2. They could try to match the U.S. program. This would be very expensive.
3. They could accept a position of inferiority. Such an acceptance would be serious, since the United States would now have a "fight the war" capability as well as a "deter the war" capability.

In each case the costs and risks of their provocation would have been increased, and it is likely that the Soviets would take these extra costs and risks into account before attempting any provocation. If they were not deterred, we could launch the crash program. Then we would be in a position to correct the results of their past provocation or at least to deter them in the future from exploiting these results.

It might be particularly valuable to have credible and explicit plans to institute crash programs for civil defense* and limited-war capabilities. It seems to be particularly feasible to maintain inexpensive and effective mobilization bases in these two fields, and the institution of a crash program would make it very credible to the Russians, our allies, and neutrals that we would go to war at an appropriate level if we were provoked again.

It is important to understand that we have this asset: the ability to spend large sums of money rapidly. Let us, for example, assume a new Berlin crisis in two or three years. Assume also that the United States has done nothing to improve its Type 2 Deterrence capability, and very little to improve its limited-war capability, but it does have a first-rate Type 1 Deterrence (one that could punish the Soviets if they attacked us, but one that could not protect the United States). Under these circumstances it would be most improbable that we would initiate either a thermonuclear or limited war if the Russians gradually put the squeeze on Berlin. Nevertheless, State Department negotiators would try in all likelihood to get the Soviets to back down by threatening that we would do something very violent—that we would use our military forces. But our negotiators would be afraid to spell out our threat, for nothing that they could present would be both credible and effective.

*For a discussion of the possibilities, see Herman Kahn, *Some Specific Suggestions for Achieving Early Non-Military Defense Capabilities and Initiating Long-range Programs*, The RAND Corporation, Research Memorandum RM-2206-RC, January 2, 1958, rev. July 1, 1958.

Even today the Russians have told us that any talk of our maintaining our position in Berlin by force is "bluff." If we send soldiers, they say they will kill them; if we send tanks, they will burn them; if we send bombers, they will destroy our cities. The Soviets are saying that at any level of violence we care to use they can either meet that level on the spot or promise such a severe punishment that we will be deterred. The Russians also point out that Berlin is a chess game, not a poker game, and that everybody can see what our capabilities are.

If the Soviets are right—that our only alternatives are violence or defeat—where defeat would be an acceptance of some new and unsatisfactory status of Berlin, then the Soviets could probably succeed in talking us into adopting a face-saving method of losing Berlin rather than one that would make it clear to all that we had suffered a serious defeat.

In actual fact we do have some very strong cards to play, but if we do not know what these cards are, we may be tricked out of playing them. If we refused to accept a face-saving defeat and the Russians persisted in rubbing our noses in the dirt, then it would be clear to all in NATO that unless we did something spectacular to recover the situation, these nations could no longer rely on us for any kind of protection. Under such circumstances the United States might order an attack. It is much more likely that it would authorize enormous defense budgets, probably at least at the 100-billion-dollars-a-year level. These funds would be designed not only to improve our current posture but also to buy large limited-war forces and such things as civil defense and the corresponding military forces that

would give us a credible capability for initiating a war at some appropriate level of violence if a humiliating crisis should be repeated. There would also be enormous pressure under these circumstances on the NATO nations to combine into an even tighter alliance and to mobilize their resources for their defense. This would mean that as in Korea, even if we lost Berlin in the military sense, the Russians would have lost this particular campaign. While Berlin is important ethically and politically, its loss would not compare to the greatly increased power and resolve on the side of the West.

This is one of the major threats we can bring to bear on the Russians. If we are not aware that we have this threat, if we believe that doubling the budget would really mean immediate bankruptcy or other financial catastrophe, then the Russians can present us with alternatives that may in the end result in their winning the diplomatic, political, and foreign-policy victory. It is important that we understand our own strengths as well as our possible weaknesses.

CONCLUSIONS

Even if we have acquired the highest-quality Type 1 Deterrence capability, we must still be able to fight and survive wars as long as it is possible to have such a capability. This is true not only because it is prudent to take out insurance against a war's occurring unintentionally, but also because we must be able both to stand up to the threat of fighting a war and to credibly threaten to initiate one. We must make it risky for

the enemy to force us into situations in which we must choose between fighting and appeasing. We must have an "alternative to peace," so long as there is no world government and it is technologically and economically possible to have such an alternative. It is most likely that this "alternative to peace" must include a general-war capability as well as a limited-war capability.

Under current programs the United States may in a few years find itself unwilling to accept a Soviet retaliatory blow, no matter what the provocation. To get into such a situation would be equivalent to disowning our alliance obligations by signing a non-aggression treaty with the Soviets—a non-aggression treaty with almost 200 million American hostages to guarantee performance. Before drifting into such an "alliance," we should ask ourselves, What does it mean to live with this non-aggression treaty? Can we prevent it from being "signed"? Can we delay its "ratification"? Those who would rely on limited means to control possible Soviet provocations must ask themselves the question, What keeps the enemy's counteraction to acceptable limits if there are no credible Type 2 Deterrence capabilities? Those who think of very limited capabilities or mutual-homicide threats either separately or in combination as being sufficient to meet our Type 2 Deterrence problems are ignoring the dynamics of bargaining and conflict situations. When two men or two nations are arguing over something that both feel to be of moderate importance, it is common for things to get out of control, for prestige to become committed, and for threats and counterthreats and actions and

counteractions to increase in almost limitless intensity—that is, unless there are internal or external sanctions to set and enforce limits.

These remarks will distress all who, very properly, view the thought of fighting a war with so much horror that they feel uneasy at having even a high-quality deterrent force, much less a credible capability for initiating, fighting, and terminating all kinds of wars. While one can sympathize with this attitude, it is, I believe, close to being irresponsible.

The threat of force has long been an important regulatory factor in international affairs; one cannot remove or greatly weaken this threat without expecting all kinds of unforeseen changes—not all of them necessarily for the better. True, many of the measures that preserve our ability to fight and survive wars may turn out to be temporary expedients that will not solve our long-run security problems, but this does not mean they are not important. You cannot reach 1970 or 1975 if you do not successfully pass through 1960 and 1965. If we neglect our short-term problems, we are bound to run serious risks of a disastrous deterioration in the international situation or in our own posture. This, in turn, may make it impossible to arrive at a reasonable, stable state.

In fact, insofar as the balance-of-terror theory is correct, if any nation actually is militarily provocative, then, no matter what our previous threats have been, we must meet that behavior by using limited means or simply allow that nation to get away with whatever it is trying to do. The aggressor will realize this too and gain confidence from the realization. For this

reason any attempt to use threats of mutual homicide to control an aggressor's behavior (short of trying to deter him from an attack on one's own country) is ill advised. Even if one means that threat seriously, it will still not be credible to the enemy or ally—particularly if the challenge is in any way ambiguous.

Since it now seems most unlikely that the Soviet menace will go away of itself and since we have eschewed preventive war as a possibility, we must seek the solution to our problems along the path of some degree of coexistence or collaboration. To do this effectively we must appear extremely competent to the Soviet leaders. They must feel that we are putting adequate attention and resources into meeting our military, political, and economic problems. This is not a question of attempting to bargain from strength, but one of looking so invulnerable to blackmail and aggressive tactics that Soviet leaders will feel it is worth while to make agreements and foolish not to. We must look much more dangerous as an opponent than as a collaborator, even an uneasy collaborator.

I have the impression that up to about 1956–57 the average senior Russian had an enormous respect for U.S. planners and decisionmakers—which they now (in 1960) have begun to lose. Many of their comments on remarks made by some of our military and political leaders are contemptuous. In the precarious present and the even more precarious future it would be well to go to some trouble not only *to be* competent as an antagonist to the Russians, but *to look* competent.

Ideally, winning the cold war would mean the establishment of peaceful, democratic, and prosperous nations everywhere

and the complete elimination of all international conflicts of greater significance than those that, for example, occasionally plague U.S.-British relations. No sober student of the international scene visualizes anything of this sort occurring! Even a more limited objective—the attainment of a physical security that is independent of Soviet rationality and responsibility—is probably unattainable. There is no acceptable way to protect ourselves from a psychotic Soviet decisionmaker who launches a surprise attack without making rational calculations.

But the situation is worse than this. It is most unlikely that the world can live with an uncontrolled arms race lasting for several decades. It is not that we could not match Soviet expenditures; it is simply that as technology advances and as weapons become more powerful and more diverse, it is most likely that there will have to be at least implicit agreements on their use, distribution, and character if we are not to run unacceptably high risks of unauthorized or irresponsible behavior. No matter how antagonistic the Soviets feel toward us, they have common interests with us in this field. This does not mean that they will not try to exploit the common danger to obtain unilateral advantages; it simply means that there is an important area for bargaining here, one that we must fully exploit.

As a prerequisite to exploiting it we must do our homework. We must know what we are trying to achieve, the kinds of concessions that we can afford to give, and the kinds of concessions that we insist on getting from the Soviets. All of this will require, among other things, much-higher-quality preparations for negotiations than have been customary.

The intellectual quality of discussion could probably be improved if criticism were both more discerning and more savage. We should learn to distinguish between first-strike and second-strike forces, between Type 1 and Type 2 Deterrence, between the use of credible and silly threats of retaliation, between "bankruptcy" and a reduction in standards of living, between sober and reliable measures and desperate gambles or "calculated risks," between deterrence by assumption and deterrence by objectively capable systems, etc.

Aside from the ideological differences and the problem of security itself, there do not seem to be any other objective quarrels between the United States and Russia that justify the risks and costs to which we subject each other. The big thing that the Soviet Union and the United States have to fear from each other is fear itself. (I am making some very optimistic assumptions. One is that the Soviets would really be willing to give up any hope of world domination to be achieved by the use of military force. Another is that they would give up their curious notion that the only satisfactory *status quo* is a situation in which the Soviet World increases every year and the Free World decreases, and that all kinds of subversive and violent activities are part of this peacetime *status quo*. On the other hand, our understandable hope that one day the satellite nations will be liberated does not look to the Soviets like a reasonable acceptance of *status quo*.)

Aside from the caveats given above about Soviet and United States expectations and hopes, and the problem of security itself, both the Soviet Union and the United States are *status*

quo powers. In this respect, the situation is quite different from what it was in World War I when all the great powers competed in trying to carve out empires for themselves, both inside and outside Europe. Today a normal increase of two or three years in the gross national product of either Soviet Russia or the United States is of much greater significance both militarily and economically than quite sizable additions or subtractions of territory. This means that we can both afford to be relaxed about changes in our respective "spheres of influence." But even if it were conceded that all we have to fear is fear, this would not imply that the problem is simple, or even that it can be eliminated by any kind of arrangements that are practical for the next decade or so. It is only to say that there do not seem to be any fundamental blocks to making things more manageable and safer than the current arrangement, which is an almost uncontrolled arms race ameliorated by some implicit (and vague) agreements and some unilateral actions.

Even if we arrive at some arms-control agreements that eliminate the most dangerous aspects of the competition, we may still need the threat of force to regulate the minor clashes that occur. While many people are suggesting various versions of a "rule by law" to prevent minor clashes from becoming major ones, I am not very hopeful that we can succeed totally. Such efforts are to be encouraged—in fact they are indispensable—but they can alleviate the problem only to the point where inevitable conflicts of interest can be handled, not eliminated. We will still need a balance of terror or other military sanctions to persuade those who would be tempted to use violence to use

other machinery instead. If the balance is to be stable and not subject to being overturned by minor changes in tactics, posture, technological innovation, or cheating on arms-control agreements, then initially it will have to be based on a massive program.

However, we must also take seriously the problem of alleviating the conflict by arms control and international agreement. We do not have unlimited time. Our problems are being increased rapidly by many things, including the mounting rate of technological progress, the "revolution of rising expectations," increasing nationalism, and an increasing diffusion of the newer military technologies. It is possible that there may be some invention, discovery, or crisis that simply cannot be handled even momentarily in our present international society. Progress is so fast, the problems are so unprecedented, and the lead-times for cultural assimilation are so long that it is difficult to believe that muddling through will work. We will need much better mechanisms than we have had for forward thinking, imaginative research into problems of strategy and foreign policy, and anticipating future developments and planning to meet them.

These mechanisms can be made available. The tools actually or potentially available to the analyst, planner, and decision-maker, both organizational and technical, are many times better than anything we have had before. It is just barely possible that with determined efforts by large numbers of responsible people we can achieve enough to make a significant difference. The survival of our civilization may depend on this effort's being made. Let us hope that it can be.