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RESEARCH MEMORANDUM

THE ANATOMY OF DETERRENCE

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PREFACE

This paper is one in a series in preparation by the author on the general theory of air strategy in a nuclear age. Although each of the papers is intended as a chapter in the larger study, a few are being released as separate publications in view of their particular relevance to current problems.

Papers thus far issued are:

The Heritage of Douhet, RAND Research Memorandum, RM-1013, December 31, 1952 (Unclassified)

Is There a Defense?, RAND Research Memorandum, RM-1781, August 16, 1956 (Confidential)

Implications of Nuclear Weapons in Total War, RAND Research Memorandum, RM-1842, December 17, 1956 (Unclassified)

The Meaning of Limited War, RAND Research Memorandum, RM-2224, July 30, 1958 (Unclassified)

SUMMARY

The present memorandum is, as the title suggests, an effort by the author (with some assistance from his colleagues), to think through some of the peculiar and historically novel requirements of a deterrence posture. The argument is that modern deterrence is like traditional deterrence in some respects but significantly different in others; it differs especially in that we look upon deterrence of total war today as something that must go permanently unchallenged. There is also presumptive evidence that a deterrence strategy diverges significantly from a strategy which emphasizes ability to win if war comes.

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Introduction

From the American point of view, the strategy of deterrence, and the related principle of limiting to tolerable proportions whatever conflicts become inevitable, tend to spring from the premise that the favorable results of a total war can never be sufficient to justify its cost. Such a war, according to that conception, would be too big, too all-consuming to permit the survival even of those final values, like personal freedom, for which alone one could think of waging it. It need not be certain that it would turn out so badly; it is enough that there is a large chance that it would.

The conceptions of deterrence and of limited war also take account of the fact that the United States is, and has long been, a status quo power. It is uninterested in acquiring new territories or areas of influence or in accepting great hazard in order to rescue or reform those areas of the world which now have political systems radically different from our own. On the other hand, as a status quo power it is also determined to keep what it has, including existence in a world of which half or more is friendly or at least not sharply and perennially hostile. In other words, the minimum security objectives for the United States must include not only its own national independence but also that of other countries which presently have and cherish such independence, especially those which enjoy democratic political institutions comparable to our own. Among the latter are numbered those nations with which we

have a special cultural affinity, that is, the countries of western Europe.

The policy which seeks to protect all we have has been called the policy or strategy of "containment." The conception of containment has been abused, by those who would presumably do more rather than less, but the policy of doing more seems quite unable to generate any real dynamism behind it. The reason is that the moment something specific is suggested, one has to take account of attendant risks. Such awareness is pleasantly blanked out so long as talk about "liberation" or "rollback" remains general and abstract.

The philosophy of deterrence also takes account of the enormous American cultural resistances to hitting first in a period of threatened total war. That is not to say that it is out of the question that we should do so. It is possible that we will build so much automaticity and sensitivity into our retaliatory response that it could be triggered by an "indication of hostile intent" rather than a hostile act. Such a development would probably be attributable more to absent-mindedness on the part of our political leaders than to design, but such absent-mindedness is commonplace in peacetime in the area of strategic decision. Also, we must not forget that there is likely to be a threshold of "intolerable provocation" short of direct attack upon us, even though we cannot determine before the event where that threshold is or ought to be.

Nevertheless, it remains unlikely that our government will ever deliberately initiate a total war for the sake of securing to ourselves the military advantage of the first blow, however considerable that advantage may be. The operational corollary of that point is that we must do what we can to reduce the advantage that might accrue to the enemy if he hit first. The planners' willingness to spend large sums on reducing the vulnerability especially of the retaliatory force provides a good check on whether a strategy of deterrence is seriously intended and internally consistent. Because budgets are always limited, a readiness to spend money on the security of the retaliatory force argues willingness to do without the extra bombers and missiles which that money could otherwise buy and which add only to the capability we have <u>if we strike first</u>.

DETERRENCE OLD AND NEW

Deterrence as an element in national strategy or diplomacy is certainly nothing new under the sun. However, since the development of nuclear weapons, the term has acquired not only a special emphasis but also a distinctive connotation. It is usually the new and distinctive connotation that we have in mind when we speak nowadays of the "strategy of deterrence."

The threat of war, open or implied, has always been an instrument of diplomacy by which one state deterred another from doing something of a military or political nature which the former did not wish the latter to do. Frequently the threat was completely latent, that is, the position of the

monitoring state was so obvious and so strong that no one thought of challenging it. Governments, like men generally, usually have been aware of the hazards involved in provoking powerful neighbors, and have governed themselves accordingly. Because avoidance not only of wars but even of crises hardly makes good copy for historians, we may infer that the past successes of some nations in deterring unwanted action by other nations add up to much more than one would gather from a casual reading of history. Nevertheless, the very large number of wars that have occurred in modern times proves that the threat to use force, even what sometimes looked like superior force, has often failed to deter.

We should, however, notice the positive function played by the failures. The very frequency with which wars occurred contributed importantly to the credibility inherent in any threat. In diplomatic correspondence, the statement that a specified kind of conduct would be deemed "an unfriendly act" was regarded as tantamount to an ultimatum and to be taken without question as seriously intended.

Bluffing, in the sense of deliberately trying to sound more determined or bellicose than one actually felt, was by no means as common a phenomenon in diplomacy as latter-day journalistic interpretations of events would have one believe. In any case it tended to be confined to the more implicit kinds of threat. In short, the operation of deterrence was dynamic; it acquired relevance and strength

from its failures as well as its successes.

However, the policy of deterrence we are talking about today is markedly different in several respects. For one thing, it uses a kind of threat which we feel should be absolutely effective, allowing for no breakdowns ever. The sanction is, to say the least, not designed for repeating action. One use of it will be fatally too many.

We thus have the anomaly that deterrence is meaningful as a strategic policy only when we are fairly confident that the retaliatory instrument upon which it relies will not be called upon to function at all. And that instrument, if we are to be sure of its not being used, has to have its capacity to function maintained at a very high level and constantly refined -- which can be done only at great cost to the community and great dedication on the part of the personnel directly involved. We are, in other words, expecting the system to be constantly perfected while going permanently unused. Surely we must concede that there is something almost unreal about it.

THE PROBLEM OF CREDIBILITY

Even so, the unreality is minimal when we are talking about what we shall henceforward call "basic deterrence," that is, deterrence of direct, strategic, nuclear attack upon targets within the home territories of the United States. In that instance there is little or no problem of credibility as concerns our reactions. The enemy has little reason to

doubt that if he strikes us, we will certainly try to hit back.

But the great and terrible apparatus which we must set up to fulfill our needs for "basic deterrence," and the state of readiness at which we have to maintain it, creates a condition of almost embarrassing availability of huge power. The problem of fitting this power into a reasonable conception of its utility has thus far proved a considerable strain. It was responsible at one time for our espousal of the doctrine of "massive retaliation," which we have since rejected in theory but not entirely in commitment. One of the first things wrong with the doctrine of massive retaliation, where it has been meant as a response to less than massive aggression, is that the enemy with a considerable nuclear capability of his own may find it hard to believe that we mean it.

On the other hand, it would be tactically and factually wrong to assure the enemy in advance (as we tend to do by constantly assuring ourselves) that we would in no case take off against him until we had already felt some bombs on our cities and airfields. We have, for one thing, treaty obligations which forbid so far-reaching a commitment to restraint. It is also impossible for us to predict with absolute assurance our own behavior in extremely tense and provocative circumstances. If we make a wrong prediction about ourselves, we also encourage the enemy to make a wrong prediction about us. The outbreak of war in Korea in 1950 followed that pattern. The wrong kind of prediction in the future could precipate that total war which too many persons have lightly concluded is

now impossible.

DETERRENCE STRATEGY VERSUS WIN-THE-WAR STRATEGIES: THE SLIDING SCALE OF DETERRENCE

But to return now to the simpler problem of basic deterrence. The capacity to deter is usually wrongly identified with the capacity to win a war. Assuming always that "to win" has some useful meaning in a modern total war, we may be sure that it requires either a decisive and effective superiority in strategic air power (by "effective" we mean mostly "available when needed", which may be after an enemy attack) or more likely some striking success of initiative. Inasmuch as effective superiority is always a very good thing to have if one can afford it, one sees that the confusion between deterring and winning has some method in it. But deterrence effect in itself does not depend on superiority.

Prior to the nuclear age, a force which was clearly inferior to a rival's might or might not have some real deterrence value. Surely it is reasonable to surmise that if Stalin had had in late 1939 a better estimate of the capability of the Finns to defend themselves, he would have been much less ready to attack them. If we can deduce his incentive in attacking from the peace terms he ultimately laid down, it seems not to have been so much a desire to conquer and absorb some extra territories, let alone the whole Finnish nation, as it was the wish to administer to the Finns and to others a sharp "lesson." That object was compromised by the successes of the Finnish resistance, despite their final defeat. What

we wish to emphasize by this example is that deterrence has always suggested something relative, not absolute, and that its effectiveness must be measured not only by the amount of power that it holds in check, but also by the incentives to aggression residing behind that power. We can easily see how truistic this point is when we recall that neither Mexico nor Canada needs military power to defend itself from the United States; but truistic or not, the point is implicitly denied by those who equate "deterrence" with "capacity to win."

Now that we are in a nuclear age, the potential deterrence value of an admittedly inferior force may be sharply greater than it has ever been before. Let us assume that a menaced small nation could threaten the Soviet Union with only a single thermonuclear bomb, which, however, it could certainly deliver on Moscow if attacked. This retaliatory capability would be sufficient to give the Soviet government much pause. Certainly they would not invoke the destruction of Moscow wantonly, that is, for trivial gains. If we think of five to ten H-bombs delivered on as many of the largest Soviet cities, the deterrence would no doubt be significantly greater -- though we would still be far from talking about a force which is either superior to that of the Soviet Union or capable of decisive results.

If we attempt to plot a curve denoting "deterrence effect" as a function of the numbers of thermonuclear weapons expected to fall on the aggressor's cities -- with "deterrence effect" measured along the orginates and numbers of bombs given as abscissas -- we can surmise that the curve begins at a rather

high level of deterrence for the first such bomb, and that while it moves significantly higher as the number of bombs increases beyond one, it does so at a decreasing rate. At a relatively modest number (probably well short of a hundred) the curve is closely approaching the horizontal. The asymptote representing maximum possible deterrence which it is possible to reach with this kind of threat would very likely require something acknowledged to be "decisive superiority" over the enemy, but it is likely also that very considerably less force would buy only trivially less deterrence.

This is not to say that for that reason we have no interest in "win the war" capabilities and strategies. So long as there is a finite chance of war, we have to be interested in outcomes; and although all outcomes would be bad, some would be much worse than others. Also, if we could imagine a conspicuous capability for winning wars which was able to survive even a surprise attack by the enemy, we should have to acknowledge the ultimate in deterrence.[1] But we have to be ready to recognize that deterrence philosophies and win-the-war philosophies may diverge in important respects. We can say in advance that they are likely to diverge in terms of priority. The objective of erecting a high degree of deterrence takes a higher priority than the objective

[1]Provided it was coupled also with the threat of very large damage. Historically it has not been true that nations always regarded ultimate military defeat as more serious than very heavy damage. Defeat has often been accepted in order to avoid such damage, even where victory was far from hopeless. If that were not so, there would be very little hope for limiting war.

of assuring ourselves of a winning capability, if for no other reason than the first is likely to be prerequisite to the second anyway, and is likely also to cost less. We are also likely to feel a divergence between the two philosophies when it comes to considering alternative military policies in terms of comparative degrees of provocativeness. For the sake of deterrence we want usually to choose the less provocative of two security policies, even where it might mean some sacrifice of efficiency. But if we were in fact interested primarily in winning and only secondarily in deterrence, we should be extremely loath to make any such sacrifices.

Let us be quite clear that the curve described in the penultimate paragraph above does not represent how decision-makers would react to a situation. It is most unlikely that a particular point in the scale of estimated counter-blows would represent for them, in any firm, objective way, the dividing line between a "go" and a "no-go" decision. Human beings, differing widely as they do in temperamental and psychic makeup, simply do not make difficult and momentious decisions on that basis. Much more is left to what we have to call "intuition." Nevertheless, the curve described above is useful for communicating the intelligence climate in which the decision is made.

We must notice also that when we talked about ultimate deterrence probably depending on "decisive superiority," we were implying, for the first time in the discussion, a comparison in the degree of damage likely to be suffered by each side. Prior

to this point we were talking of deterrence as something resulting from a unilateral consideration of damage, that is, an estimate of the damage likely to be suffered by oneself. This is the issue that seems to provoke so much confusion about deterrence. It is a truistic statement that by deterrence we mean obliging the opponent to consider, in an environment of great uncertainty, the probable cost to him of attacking us against the expected gain thereof. It is only a shade less obvious that the cost has to be measured in terms of damage to himself. But what seems very difficult to grasp is that his gain cannot be measured simply in terms of damage to us (or vice versa) even though such damage may indeed provoke an act or condition (i.e., surrender or military obliteration) which he legitimately considers a gain because it terminates a threat. But damage to an opponent, however large, which for one reason or another fails to have such an effect may be no gain at all.

To be willing to accept enormous destruction only for the sake of inflicting greater destruction on the enemy (which may be all that some mean by "winning") argues a kind of desperation at the moment of decision which rules out reason. We have to expect that at certain extreme conditions of excitement,

which may involve erroneous conviction that an enemy attack upon oneself is imminent, the deterrent posture will tend to collapse or be discarded without further regard to estimates of damage or of gain to either side. But all that means is that the rationality upon which deterrence must be based is ultimately frangible -- a conclusion of which history has already given us ample indication.

Another attitude that gets in the way of understanding deterrence is the one which alleges that Soviet leaders, when faced with issues of peace and war, would be indifferent to the loss of individual cities and certainly of the populations (as distinguished from the production capital) within those cities. The implication of this view is that a government or leadership imbued with that kind of indifference can be deterred not by considerations of loss in any graduated sense of the term, but only by the prospect of <u>losing a war</u>. This is hardly the place to attempt to weigh the evidence for and against such an attribution of indifference. But as this writer sees it, the view just described grossly distorts and exaggerates some undeniable and important differences between the Soviet system and our own.

Certainly insensibility to human suffering among subject

populations, especially when it can be rationalized as a necessary price for alleged future benefits, is much more characteristic of the Soviet system than of our own. This fact probably affects significantly the dynamics of deterrence as described in preceding paragraphs. But it is not enough to subvert those dynamics. The Soviet leaders might be appreciably less shocked and distressed than our own leaders would be in comparable circumstances by the loss through nuclear bombing of one or more of their large cities, but they certainly would not be indifferent to it -- either on humanitarian or prestige grounds.

Of course, we have to remember that the Soviets have a very high incentive for destroying us, or at least our military power, if they can do so -- at minimum the incentive of eliminating what is to them a great threat. As we emphasized earlier, the question of incentive is decidedly relevant to the issue of deterrence. In fact, deterrence is simply the effort to erect appropriate disincentives to counteract the incentives which the opponent feels for our destruction, disincentives which not only guarantee him pain if he attempts to attack us but also heighten his uncertainty about the immediate results of his contemplated attack. Let us remember also that his incentives to destroy us, while always high, are probably not invariable. They are likely to change significantly with changes in the political and technological environment.

To return now to our conception of a "deterrence effect" curve -- for which we cannot, of course, fill in specific values -- we many now consider how it assists us in formulating our strategic problems.

First, it should be obvious that what counts in basic deterrence is not so much the size and efficiency of one's striking force before it is hit as the size and condition to which the enemy thinks he can reduce it by a surprise attack -- as well as his confidence in the correctness of his predictions.[2] However, to many who are in one way or another charged with military planning, that point is not at all obvious. The reasons for their rejecting it may vary. Some are simply unused to thinking in terms of the enemy having the initiative, preferring always to think in terms of our having it. This is an age-old addiction of official war planners. Others, more sophisticated, apparently feel that a force that lets itself take the first blow will not be strong enough to win a war, regardless of what it has done to protect itself, and they are by training, tradition and often temperament interested only in strategies that can win. They are preoccupied with getting the offensive force launched against the enemy while it is still able to win -- i.e., before it is hit.

[2]The pre-hostilities size of one's retaliatory force does have a distinctive and possibly important deterrence effect because of the enemy's concern with what it will mean for him if his attempt to destroy it by surprise attack should fail utterly. Of course, he may grossly misestimate, in either direction, the chance of failure.

They are either not interested in a predominantly deterrence strategy, or they are convinced that a force not strong enough to win is not strong enough to deter. Underlying both views is also the conviction that money spent on protecting the retaliatory force could be spent instead on expanding it.

The latter conviction is certainly correct. The same kind of problem, of deciding how much it is worth paying to design protection into an offensive force, has been faced many times before, notably in the history of warship development. Armor on warships has always been expensive and has also absorbed a great deal of the weight-carrying capacity of the ship. So later did antiaircraft armament. The initial bias of the users has usually been against "sacrificing offensive for defensive armament" (to quote a slogan of the U.S. Navy prior to our entry into World War II), but battle experience would finally intervene to force the necessary adjustment. Each new category of weapons seems to require the same kind of adjustment through the same kind of contact with experience. Perhaps the fact that thermonuclear weapons have made it possible, for the first time, to conceive of having more offensive power than we really need will make it easier to shift emphasis from buying more and better bombers and missiles to buying more and better protection for bombers and missiles. In any case, the overriding considerations should be that the nation is committed primarily to a deterrence policy,

and that such a commitment dictates concern with the survival of a retaliatory force of reasonable size following enemy attack.

If it were possible to guarantee the survival of a hard-core retaliatory force of reasonable size by protecting massively in individual shelters, even at very high unit cost, a preselected portion of one's entire retaliatory force, that would be the way to go about it. The rest of the force could do with less massive protection on the grounds that the worst imaginable contingencies are not the only likely ones, and may not even be the most probable ones. However, in view of the cratering effects of large thermonuclear weapons exploded at ground level, and considering also the accuracy of delivery at least of manned bomber aircraft, it is difficult to imagine a shelter which had been singled out for attack being strong enough to withstand that attack. Obviously, a much larger proportion of one's total striking force, and preferably the whole of it, has to be given a high level of protection -- as well as dispersion and concealment -- to make it likely that a reasonable proportion of it will survive. Such a procedure also ensures that the enemy, if he comes at all, has to come in large force, which greatly diminishes his chances for surprise.

The principle of a sliding scale of protection could conceivably be applied in other ways. One way would be to have a proportion of the total force always in flight, fully armed,

with tankers in attendance, and another portion kept in very advanced readiness. The U.S. Air Force had indicated, in numerous public pronouncements, its interest in dealing with the problem of vulnerability by such means. But such a system is exceedingly expensive, enough so to force reconsideration of the shelter system suggested above. Also, it is likely to be more provocative than a shelter system to the opponent. And as far as advanced readiness is concerned, it has considerable value against manned aircraft attacks, but little or none against missile attacks.

From the security point of view, there is also likely to be some value in diversification for the hard-core survival forces, because it tends to insert additional uncertainty in the opponent's prestrike calculations. For example, the use of nuclear-powered submarines as a means of hurling nuclear missiles of the Polaris type against strategic targets would seem to be a desirable supplement to a well-protected, land-based force, even if it proved to be (which is by no means presently established) a costlier method measured by effects achieved at targets. The submarine is free of that main defect which characterized the aircraft-carrier, its relatively easy detectability by airborne radar combined with high vulnerability to atomic attack.

DETERRENCE AND THE CHOICE OF BOMBING VEHICLES: MISSILES VERSUS AIRCRAFT

We have thus far stressed the necessity, for deterrence purposes, of providing for a retaliatory force which will survive surprise attack. But the surviving force must also appear to have a good chance of penetrating fully-alerted

enemy defenses even if launched in relatively small numbers. This requirement affects the choice of vehicles for the hard "deterrence core" of the retaliatory striking force. It undoubtedly upgrades, for example, the value of the long-range ballistic missile as compared with the manned aircraft.

If the ballistic missile is compared with the manned aircraft on any grounds other than penetration capability, the latter appears able easily to hold its own for some time into the future. The airplane can carry heavier and therefore (for the present) more powerful thermonuclear weapons, and it can deliver them more accurately than the missile. It can be protected on the ground through the use of a heavy shelter at least as easily as can the larger and more delicately-constructed missile. The aircraft which takes to the air frequently can be more reliably depended upon to do so at the moment of need, and, for those held in advanced readiness, probably with a shorter preparation and check-out time, than the never-previously-flown missile. In addition, the aircraft has the special factor of "recallability," the capability of being sent out at inconclusive warning of enemy attack -- thus getting it off the ground into the safer air -- subject to being recalled within a reasonable period of time if the warning turns out to be false. This factor of "recallability" has been considered especially valuable to the advanced-readiness force. If one did not have to think about enemy active air defenses, the aircraft would probably also be a cheaper way of assuring a given amount of target destruction, especially where the targets are other than cities and where accurate aiming is required.

However, the speed of the missile not only denies the victim appreciable warning time, but also makes the problem of coping with it through active defenses extraordinarily difficult, even if not altogether hopeless. An anti-missile missile is probably feasible, but to design into it the requisite sensitivity and quickness of reaction, and at the same time immunity to deceptive signals, is going to be anything but easy.[3] The problem of destroying missiles in flight is incomparably more difficult than that of destroying aircraft, and we are very far yet from being in an era when it is a simple matter to destroy enemy manned bombers in flight.

The conclusion is unavoidable that for some time to come, the ideal strategic bombing force will be a mixed missile and manned-aircraft force. But because of the penetration problem, which is bound to be much more difficult in a counter-attack than in a surprise initial attack and which will go up disproportionately in difficulty as the number of attacking vehicles diminishes (except where the numbers are kept small in an initial attack for the sake of surprise), one should expect that the missile will be favored in the "hard-core" of the retaliatory force.

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[3]As something to be mounted and maintained during peacetime, an anti-missile missile defense poses problems which are probably as severe on the political as on the technological side. Active anti-missile defense probably makes no sense unless it is highly sensitive and fully automatic, and it is precisely these characteristics which are politically objectionable in peacetime, especially for any system which utilizes nuclear weapons. False-alarm shots must occur if the system is sufficiently sensitive to be reliable against real attacks, and it is important that these should not result in atomic detonations over one's cities.

THE PROBLEM OF TARGET CHOICE FOR THE RETALIATORY FORCE

The U.S. Air Force has acquainted the public with the information that our individual SAC crews are thoroughly briefed on specific primary and alternative targets for their initial D-day strike. It has also made clear in recent years, since the Soviets have achieved a nuclear bombing capability, that while the ultimate strategic target remains the enemy "war economy" (whatever that may mean under thermonuclear conditions where the conventional materials of warfare are almost certainly meaningless), first priority has to be given to his strategic air force.

But only in the case where we hit first is such a priority certainly right. All the major conditions governing target selection may change if the enemy should strike us first and ours is a retaliatory mission. In the first place, our retaliatory force is smaller by some unknown though very likely substantial factor than the original offensive force. This smaller force, which is probably much disorganized, will now have to attempt to penetrate fully alerted defenses. The enemy air force (including missiles) is no longer at rest at its bases, ready to be struck by us to maximum effect. Its attractiveness as a strategic target had begun to decline sharply from the moment its own attack began to be airborne. Moreover, depending on the degree of surprise it achieved, it has already done a good part of its total work, certainly the

major part so far as one's own air force is concerned.

What then happens to the priority of the counter-air mission? The enemy air force has ceased to be anything like so profitable a target as it was prior to hostilities, and at the same time our capabilities for hitting it have been reduced markedly. They may have been reduced below the critical limits at which we can no longer injure his surviving air power appreciably. We can probably always prevent some enemy planes from flying second and third missions even if we have been too late to stop the first. That opportunity may be important. But it may in some circumstances not seem like a meaningful way to use up our surviving strike capability, especially if that capability is considerably reduced from the original.

What then? Perhaps we will have succeeded in putting enough target flexibility into our system so that surviving units do not simply go charging off against originally assigned targets. Even if it were a rational decision not to change the identity of the top-priority target <u>system</u>, certainly a substantial loss of planes, and hence reduction in the number making the counterattack, argues that individual targets must be reassigned to avoid serious lacunae. But we also have to reconsider the whole system.

If we consider the problem strictly from the point of view of achieving <u>before</u> hostilities the maximum deterrent effect for our retaliatory force, the answer seems to be simple.

We assign to the hard-core elements in our retaliatory force the enemy's major cities, provide for the maximum automaticity as well as certainty of response, and lose no opportunity to let the enemy know that we have done these things. The enemy therefore has reason to calculate that even a very great success against our air force in a surprise attack will, so long as it is short of 100 per cent success, result in his losing a number of his largest cities. Certainly he cares intrinsically more for those cities than he does for his airfields, especially after the latter have already done their offensive work.

Such an arrangement must surely maximize the deterrent effort of our retaliatory force. We assure the enemy, through assuring ourselves (long-term security about our intentions being very undependable), that we will not reconsider the matter in the event he attacks us. We will hit back with all our surviving power at his cities, and, especially if that surviving power contains a fair number of missiles, he can count on losing those cities. It ought not be too difficult to assure him that, come what may, he will lose fifty or more of his largest cities.

The rub comes from the fact that what looks like the most rational <u>deterrence</u> policy involves commitment to a strategy of response which, if we ever had to execute it, might then look very foolish. And the strategy of deterrence ought always envisage the possibility of deterrence failing.

Suppose, for illustration, we imagine a kind of enemy attack that is far from implausible -- in fact, one that has already been publicly proposed as a strategy we might adopt for ourselves if we ever initiated the attack.[4] Suppose the enemy attacked our retaliatory forces with great power but took scrupulous care to avoid major injury to our cities. He might indeed understand that in a thermonuclear war, the ability to destroy cities confers more military advantage as a threat than the actual destruction of them is likely to have. If his attack is to any serious degree successful, we should then be left with a severely truncated retaliatory force while his remained relatively intact. That hardly seems like a propitious set of circumstances for us to initiate an exchange of city destruction, which under such circumstances becomes mere suicidal vindictiveness.

Thus it is easy to imagine a situation where it is useless to attack the enemy's airfields and disastrous as well as futile to attack his cities. No doubt we would in our rage and helplessness strike blindly at something, and no doubt also the enemy's anticipation of such "irrational" behavior would help deter him from precipitating such a situation. Perhaps for the sake of maximizing deterrence it is wise deliberately to reject the Napoleonic maxim "on s'engage; puis on voit" -- which after all applied to a state of affairs where one had far greater

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[4]See especially Colonel Richard S. Leghorn, "No Need to Bomb Cities to Win War," U.S. News and World Report, v. 38 (January 23, 1955), pp. 79-94.

control of events after engaging than would be true of modern total war. If that is the conclusion, then the response ought to be not only automatic but sensibly so, that is, automatic against the things that hurts the enemy the most -- cities rather than airfields.

But a reasonable opposing view is that however difficult it may be to retain control of events in nuclear total war, one ought never deliberately abandon control. If so, how should we cope with an enemy offensive which exercised the kind of discriminating restraint described above? Clearly one cannot dismiss such restraint on the ground that it represents an unwise strategy. The contrary is probably true. The question is whether men who have been reared on the tradition which holds that extra damage from a delivered bomb is always a "bonus" -- a tradition which is probably as strong on the Soviet side of the military fence as it is on our own -- are likely to approach the problem in so dangerously fresh a manner.

CHOICE OF WEAPONS FOR MAXIMUM DETERRENCE

The first underwater shot of a nuclear weapon, the Baker shot at Bikini in 1946, revealed the appalling extent of radioactive debris which resulted from the explosion of a nuclear weapon, even one which by present standards was quite small. For a while it was possible to ignore this result because succeeding shots were set off, as a rule, from atop

towers more than 200 feet high. However, the Bravo shot in the CASTLE series on March 1, 1954 involved a large thermonuclear weapon set off at ground level -- putting so powerful a weapon atop the usual tower would have made little difference because of the size of the fireball -- and the enormous reach of the fallout on that occasion confirmed the existence of a tremendous lethal by-product.

It is fair to say the military would have been happy to do without this radioactive byproduct. Not only is its fall not subject to control in the general region of the target, but in wartime some of it is bound to fall on neutral or friendly countries and even to drift back to the territories of the users of the bomb. That is especially true of the long-lived, invidious soil contaminant, Strontium 90.

For those reasons a great deal of research has gone into producing a so-called "clean" bomb, that is, a thermonuclear weapon which relative to its explosive force in blast and thermal effects will produce only a slight amount of radioactive fallout. It has, of course, been well known that the opposite course was also feasible, that by adding various chemicals one could produce a weapon which released a much greater amount of radioactive fallout for its size than the already quite dirty thermonuclear weapon of the CASTLE-Bravo type. However, development of such super-dirty weapons was bound to be retarded by the feeling that they had little or no military utility and hence could not be morally justified.

But when we consider the special requirements of deterrence in the minimal or basic sense of deterring a direct attack upon oneself, a case for the super-dirty bomb becomes apparent. Since the emphasis has to be on making certain that in the event of enemy attack some bombs at least are delivered in retribution one wants these bombs to be, and thus to appear before the event, as horrendous as possible. This objective is greatly advanced by making the bomb super-dirty, which incidentally also makes accuracy of delivery relatively unimportant. No doubt it will also prove feasible by the appropriate selection of chemicals to augment close fallout without increasing the output of those radioactive elements that are characteristically carried to a great distance.

DETERRENCE AND CIVIL DEFENSE[5]

We have observed that minimal or basic deterrence as we have defined it, that is, retaliation in direct reply to attack upon ourselves, involves little strain on credibility. The enemy knows that if he hits us, and especially if he hits our cities, we will hit back if we can. The question is one of feasibility, not intention. We suspect also that such a statement holds good without regard to the state of our civil defenses at the time.

However, we have already noticed one case where even in the event of direct attack upon our own territories, the character and spontaneity of our response may become slightly

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[5]For most of the ideas in this section, I am indebted to my RAND colleague, Mr. Herman Kahn.

more doubtful. This is the case where the enemy hits us hard at our air and missile bases but takes care to minimize injury to our cities. It may be plausible to argue that in that moment of catastrophe we will be too insensitive to the discrimination he is practising to let our responses be affected by it, but at present we cannot be certain of that. This uncertainty introduces the consideration that perhaps our response will be affected by whether or not we have some shelters to put our people into.

The moment we think of deterrence in somewhat bolder terms, that is, as something practised to safeguard territories beyond our shores, the issue of whether or not we have provided reasonable protection to our population may become all-important. We may be quite sure we will hit back if hit directly ourselves, but will we do so if any of our chief allies is attacked or threatened with attack? We are, to be sure, legally committed to respond with all our power and our leaders may presently be convinced that if occasion should arise they would honor that commitment. But surely they would on such an occasion be as much affected by the consideration -- assuming no radical change from the present situation -- that our people are hopelessly exposed to enemy counterattack.

We cannot predict for any specific instance that having the appropriate shelters would make a great difference in our behavior. We could be cowardly with shelters and bold (or reckless?) without them; but surely if they existed at the moment of crisis, their effect would tend to favor courageous

rather than craven decision. We should note that in the kind of crisis situation we are hypothetically posing, the question of whether or not there will be enough warning to get people to the shelters in time does not greatly disturb us; we are assuming that our government sends them there as a result not of enemy attack but of its own resolution to act. If we have to assume that we will certainly be hit first in a surprise attack, and that all important population centers will be included as targets in the first wave of the enemy attack, then there is clearly little use for shelters in those areas. But that is, after all, a fairly extreme and one-sided assumption.

It has been pointed out also that an adequate civil defense program may prove an indispensable factor in keeping wars limited. The maintenance by the enemy of limitations acceptable to us depends on our willingness to retaliate in kind and in greater degree in the event of gross enemy violation -- going as far as the full use of SAC if need be. The enemy must also believe that we are ready to do so. Surely it would help to develop in ourselves the requisite willingness, and in the enemy the necessary credibility, if we had meanwhile provided some cover for our populations.

We are describing an area of crisis and of decision which may seem to be utterly improbable for the future. But most of the billions we are spending on the total=war aspect of national defense envisage situations which are, we hope, at least equally improbable. All our efforts are directed -- at least we intend

for them to be directed -- towards making such situations still more improbable. That is what national defense is all about in the thermonuclear age.

One does not, naturally, accord to civil defense the same level of priority that one accords to comparable measures for the defense of SAC. A secure retaliatory force is not only the sine qua non of deterrence and of national defense generally, but the one instrument which could conceivably make all other instruments designed for defense unnecessary. But prudence tells us that we need some backstops even to a secure SAC, and a well-designed shelter program for civil defense appears to fill such a need.

One school of thought holds that it is necessary and feasible to protect not only our people but also the tools and materials required for national economic recovery within a reasonable period after the war. This view suggests that a nuclear war is not necessarily the end of the world for us, let alone all humanity, and that we need not settle for anything less than the capacity to protect and preserve under attack the economic basis for our great-power status. The sums required to purchase this capacity over a five to ten year period are, allegedly, not outlandishly huge. It is possible to purchase relatively cheaply, in caves and unused mines, a great deal of floor space for the storage or actual operation of essential production capital. Some of this space is held to be already competitive, on an economic basis, with comparable

space above ground. Whether or not this apparently optimistic appraisal is true cannot be determined without a careful and detailed technical survey, such as we cannot pretend to carry on here. All we can urge now is that the whole subject deserves careful study, that at the very least protection of population must be seriously provided for, and that such protection can be reasonably justified on political and strategic as well as on humanitarian grounds.

Individuals may in fact reject this kind of thinking on the ground that they would rather take their chances with a hazardous future without seeing shelters being dug into the ground around them to provide, at best, a marginal kind of safety. The usual observation on the subject includes some reference to the general undesirability of life anyway following a thermonuclear war. Individuals are entitled to adopt such attitudes for themselves, and perhaps for their children as well, though they may be deceiving themselves about their feelings in a future crisis. Governments, on the other hand, have no moral right whatever to adopt cavalier attitudes about the value of survival.

DETERRENCE AND ARMAMENTS CONTROL

We come finally to the question of the political environment favoring the functioning of a deterrence strategy, especially with respect to the much abused and belabored subject of international control of armaments. There is a long and dismal history of confusion and frustration on this subject.

Those who have been most passionate in urging disarmament have often refused to look unpleasant facts in the face; and on the other hand, the government officials responsible for actual negotiations have usually been extremely rigid in their attitudes, tending to become more preoccupied with winning marginal and ephemeral advantages from the negotiations than in making real progress toward the presumed objective. There has also been a confusion concerning both the objective and the degree of risk warranted by that objective.

Here we can take up only the last point. One must first ask what degree of arms control is a reasonable or sensible objective. It seems by now abundantly clear that total nuclear disarmament is not a reasonable objective. Violation would be too easy for the Communists, and the risks to the non-violater would be enormous. But it should also be obvious that the kind of bitter, relentless nuclear and missile armaments race that has been going on since the end of World War II has its own intrinsic dangers. We could not view it with equanimity even if we remained confident (as we have not been since the first Sputnik) of our ability to keep ahead technologically for an indefinite period. Inasmuch as this race itself imposes the gravest risks, we ought not look askance at measures for slowing or otherwise alleviating it simply because those measures themselves involve certain finite risks. In each case the risk has to be measured and weighed against the gain.

The kind of measures in which we ought to be especially

interested are those which could seriously reduce on all sides the chances of achieving complete surprise in a strategic attack. Such a policy would be entirely compatible with our basic national commitment to a strategy of deterrence. The kinds of measures one thinks of first in this connection refer to such mutual inspection schemes as would enhance the chances of getting "strategic warning" (as opposed to the "tactical warning" derived from radar screens and the like), that is, warning of measures being taken that could be a prelude to attack.

It is important to stress that a measure may be valuable even if it is a low-confidence one. This point is generally overlooked in the pursuit of ideal but unattainable ironclad guarantees. By a low-confidence measure we do not mean one with loopholes which the opponent may exploit without fear of detection. Such a measure warrants no confidence at all. A system which presents, say, a 10 per cent probability that the opponent's preparations to launch surprise attack will be detected, but which the enemy cannot manipulate to reduce the probability still further, is a low-confidence measure. And a 10 per cent chance of detection may well be utterly unacceptable to an aggressor who feels that surprise is essential to his schemes.

Technological progress is pushing us rapidly and inexorably towards a position of almost intolerable mutual menace. Unless something is done politically to alter the environment, both sides will before many years have numerous missiles

accurately pointed at each other's hearts and ready to be fired literally at a moment's notice. Even before that time arrives, aircraft depending for their safety on being in the air in time will be operating more and more provocatively according to so-called "air-borne alert" and "fail safe" patterns. Nothing which has any promise of obviating or alleviating the tensions of such situations should be overlooked.