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STRATEGIC AND FOREIGN POLICY IMPLICATIONS OF ABM SYSTEMS

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HEARINGS

BEFORE THE

SUBCOMMITTEE ON INTERNATIONAL ORGANIZATION AND DISARMAMENT AFFAIRS

OF THE

COMMITTEE ON FOREIGN RELATIONS

UNITED STATES SENATE

NINETY-FIRST CONGRESS

FIRST SESSION

ON

THE STRATEGIC AND FOREIGN POLICY IMPLICATIONS OF ANTIBALLISTIC MISSILE SYSTEMS

PART I

MARCH 6, 11, 13, 21, 26, AND 28, 1969

Printed for the use of the Committee on Foreign Relations

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STRATEGIC AND FOREIGN POLICY IMPLICATIONS OF ABM SYSTEMS

THURSDAY, MARCH 6, 1969

UNITED STATES SENATE,
SUBCOMMITTEE ON INTERNATIONAL ORGANIZATION
AND DISARMAMENT AFFAIRS OF THE
COMMITTEE ON FOREIGN RELATIONS,
Washington, D.C.

The subcommittee met, pursuant to notice, at 10 a.m., in room 4221, New Senate Office Building, Senator Albert Gore (chairman of the subcommittee) presiding.

Present: Senators Gore, Fulbright (chairman of the full committee), Mansfield, Symington, Pell, Aiken, Cooper, Williams, and Javits.

Senator GORE. The committee will come to order.

The Subcommittee on International Organization and Disarmament Affairs opens its hearings today on the strategic and foreign policy implications of anti-ballistic-missile defense systems.

The deployment of an anti-ballistic-missile system (ABM) holds such vast portents, both internationally and domestically, that it appears advisable to this subcommittee that there be maximum involvement of the American people in the making of this decision. It may be that we have an unparalleled opportunity to arrest a developing escalation of another nuclear armaments race. If such an opportunity exists, then it is, in my opinion, vastly in the interest of the real security of the American people and for the peace of the world that we fully exploit this opportunity. On the other hand, our security may require a narrower interpretation and thus impel a deployment of a full ballistic missile defense, not just a thin one. The decision is big; the stakes high.

To illustrate the importance of this decision, I call attention to the fact that the meeting of the Conference on Disarmament scheduled for today in Geneva has been postponed until March 18 upon the initiative of the United States. I do not cite this in criticism but rather to show the need and importance of policy decision in this matter.

EFFECT OF ABM DEPLOYMENT ON BILATERAL TALKS

The first item for consideration, then, would appear to be the implications of ABM deployment for bilateral talks between the United States and the Soviet Union upon mutual nondeployment of such weapon systems, upon disarmament goals, upon peaceful negotiations in other respects, and upon ratification of the Nonproliferation Treaty by others in the family of nations.

According to widely published reports, the National Security Council extensively considered this question yesterday.

President Nixon said in his televised press conference on the day before yesterday that he would announce his recommendation on this issue early next week.

It would appear timely and helpful, then, for this committee to examine the question to the fullest extent possible in public hearings in order to develop a body of information which can serve as a basis for judgment by the Senate and by the American people.

We want to receive informed testimony concerning the United States and Soviet anti-ballistic-missile systems and the relationship of these systems to the overall nuclear weapons equation between the two super powers.

CONFLICTING INFORMATION

I deeply regret that public knowledge and understanding of this vital issue have been obscured by continuing waves of conflicting information.

I hope, though, these hearings will not only provide the public with the informed testimony on the merits, weaknesses, and implications of the system, but that they will help our citizens distinguish between the perils of momentum and the necessity for careful judgment.

Another important purpose of these hearings, as I have indicated, is to relate the anti-ballistic-missile issue to the prospects for a strategic missile understanding with the Soviet Union. In my view, both nations, as they consider antiballistic missiles and multiwarheads for their offensive weapons, stand on the threshold of a new phase in the arms race; a phase where once it begins there will be little possibility of ever turning back.

ISSUES TO BE DISCUSSED

To discuss some of these disarmament issues the subcommittee has invited Mr. Gerard Smith, Director of the Arms Control and Disarmament Agency to testify.

In the days to come the committee will hear from a number of former Presidential science advisers who will testify on the relationship of an ABM deployment to our national priorities and to the prospects for a disarmament agreement. The Presidential advisers who will appear on Tuesday, March 11, include Dr. George Kistiakowsky, professor of chemistry, Harvard University; Dr. Herbert York, professor of physics, University of California at San Diego; and Dr. James R. Killian, chairman of the board, Massachusetts Institute of Technology.

The committee also intends, as it approaches the vital question of the anti-ballistic-missile issue and the prospects for disarmament, to hear from a number of expert witnesses on the attitudes of those who are both our possible adversaries, and, in the case of the Soviet Union, our necessary partner if any agreement is to be reached. Next Thursday, March 13, Prof. Marshall Shuman, of Columbia, and Prof. Allen Whiting, of Michigan, will present their views on the possible reactions of the Soviet Union and China to the U.S. decision to deploy an anti-ballistic-missile system.

To assist the Senate and the public to develop a better understanding of the issue involved, the subcommittee has invited the former national security adviser to President Kennedy, Dr. Carl Kaysen, now director of the Institute for Advanced Study at Princeton and Dr. Donald Brennan, of the Hudson Institute, to testify on these wide-ranging implications of an ABM deployment.

The subcommittee will hear Secretary of Defense Melvin Laird on March 21.

CONSIDERATION OF BOTH SIDES OF ISSUE

The subcommittee wishes thoroughly to consider both pros and cons of this issue, its merits and demerits and possible consequences of either deployment or nondeployment.

Fortunately, we will be assisted in our understanding of the ABM system by the testimony of several of the country's most distinguished scientists—several of whom I have already cited—who have accepted our invitations.

On behalf of my colleagues today, I wish to welcome Dr. Daniel Fink, former Deputy Director of Defense Research and Engineering of the Department of Defense; Dr. J. P. Ruina of the Massachusetts Institute of Technology; the Nobel Prize winner in physics, Dr. Hans A. Bethe of Cornell University; and Director Smith.

We will begin with Mr. Gerard Smith, the Director of the Arms Control and Disarmament Agency. After hearing from Mr. Smith, I suggest that Drs. Fink, Ruina, and Bethe sit together, if it is agreeable with them, at the witness table, each giving an initial statement and then responding as a panel to the interrogation of the subcommittee. The subcommittee will be in the position of students and these three distinguished scientists and professors in the role of teacher, with the American people looking in.

Mr. Smith, the committee will be pleased to hear you.

STATEMENT OF GERARD C. SMITH, DIRECTOR, ARMS CONTROL AND DISARMAMENT AGENCY; ACCOMPANIED BY ADRIAN FISHER, DEPUTY DIRECTOR, ACDA, AND HERBERT SCOVILLE, JR., ASSISTANT DIRECTOR, SCIENCE AND TECHNOLOGY, ACDA

Mr. SMITH. Mr. Chairman, and members of the committee, as the newly appointed Director of the Arms Control and Disarmament Agency, I am impressed with the soundness of the premise in the Arms Control and Disarmament Act which provides that "arms control and disarmament policy, being an important aspect of foreign policy, must be consistent with national security policy as a whole." Also under that act, the Agency has a mandate to study both "the arms control and disarmament implications of foreign and national security policies of the United States," and "the national security and foreign policy implications of arms control and disarmament proposals."

Today's hearings clearly involve such considerations. The central one, in my judgment, at the present time is how to bring the spiraling nuclear arms race under some verifiable control. And I would like to contribute what I can to clarification of such of the issues involved in the ABM decision as relate to arms control, and particularly to the proposed talks on strategic arms limitations.

PREVIOUS EXCHANGES WITH U.S.S.R. ON ARMS TALKS

Perhaps it would be helpful at the outset to review exchanges with the U.S.S.R. that have taken place with regard to such talks.

The initiative for the strategic arms limitation talks originated in late 1966 with several informal exchanges between senior U.S. officials and Ambassador Dobrynin of the Soviet Union in Washington.

Senator FULBRIGHT. Who initiated them, Mr. Smith? I am not clear. Did we or did Ambassador Dobrynin?

Mr. SMITH. I think the record is clear we initiated the concept.

Formal exchanges began in early 1967 and, as you recall, President Johnson, at his press conference on March 2, 1967, announced that he had received a reply from Chairman Kosygin to his letter of January 27 confirming "the willingness of the Soviet Government to discuss means of limiting the arms race in offensive and defense nuclear missiles." Both the President and Secretary McNamara raised this subject during the Glassboro meetings in June 1967.

On July 1, 1968, President Johnson and Chairman Kosygin issued similar statements indicating agreement to discuss "the limitation and eventual reduction of both offensive strategic nuclear weapons delivery systems and systems of defense against ballistic missiles." The U.S.S.R. had informed us, shortly before the Czechoslovakian invasion, that it was prepared to begin talks between special representatives. The Soviets have continued to show strong interest in pursuing this subject, as evidenced by the Tass article on Inauguration Day indicating their willingness and readiness to begin talks.

President Nixon indicated at his press conference last Tuesday that, although he thinks that both the interests of the United States and the Soviet Union would not be served by simply going down the road on strategic arms without, at the same time, making progress on resolving political differences, he did not intend to leave the impression that we are saying to the Soviet Union that unless they do this we will not have talks on strategic arms. The executive branch is reviewing on a priority basis the overall U.S. strategic force posture, including both offensive and defensive systems. This review includes arms control considerations. And I would like to say that my Agency, among others, is actively engaged in this review and in preparation for talks, and that I have devoted a good part of my time to this subject since taking office.

NEGOTIATIONS ON BOTH OFFENSIVE AND DEFENSIVE SYSTEMS

It is important to note that these negotiations with the Soviet Union would relate to both offensive and defensive systems, and not just to ABMs. This is so because of the interaction of the two types of systems. The Soviets are not interested in talking only about ABMs.

The objective is to prevent an escalation of the arms race. Thus, for example, if we were to deploy a "thick" ABM system, the Soviets might well react by increasing their offensive capabilities in order to penetrate it. But if we could reach a satisfactory agreement, putting limitations on both offensive and defensive strategic systems, we might avoid this action-reaction phenomenon, which would entail a great expenditure of effort and resources without any net gain to U.S. security.

FOREIGN ATTITUDES TOWARD U.S. ABM DEPLOYMENT

At this point I might comment briefly on foreign attitudes toward ABM deployment and the proposed strategic arms limitation talks. These attitudes were ascertained prior to the President's recent trip to Europe.

Informed opinion abroad, and particularly in Europe, views the ABM problem as one primarily affecting the United States and U.S.S.R. There is a general feeling, shared by all our allies, that United States-Soviet negotiations involving ABMs, as well as offensive systems, would be desirable. Our allies want us to consult with them regarding progress of any such negotiations and we have assured them we shall do so.

Let me turn now to the question of ABMs. Under the budget cycle, the new administration has to make its decision with respect to fiscal 1970. This review should be completed in the near future. My agency is participating in the review, and in the deliberations of the National Security Council.

Before the review is completed, I think it would be inappropriate for me to comment on it. What I can say is that arms control considerations are being given serious attention.

I assume that you are primarily interested in hearing from me today about the possible impact on the strategic arms limitation talks of any decision which might be made on the U.S. ABM program as a result of this review. For the reasons I have indicated, I must confine myself to general observations.

1967 SENTINEL DECISION

Let us assume, as one possible example, resumption of the Sentinel deployment program along the lines recommended by the previous administration. This program was announced in September 1967 after the United States had advised its allies and the Soviet Union. As stated at that time, the basic purpose of the Sentinel deployment was primarily to limit possible damage from minor strategic threats. Great effort was made to prevent this decision from being misconstrued and becoming a steppingstone to a new upward spiral in the strategic arms race between the United States and the U.S.S.R. I would think that a decision to resume some such deployment at this time would not prejudice the prospects for strategic arms limitation talks.

We cannot, of course, know what the Soviet reaction was to this previous Sentinel decision since we don't know in sufficient detail what motivates Soviet programing. U.S. ABM programing is only one of many factors which influence their strategic plans. It should be noted that there was very little public Soviet reaction to the original Sentinel announcement. However, since the 1967 ABM decision, the Soviets have continued to expand their strategic offensive forces, probably to be confident of maintaining their deterrent, or "assured destruction," capability in light of the overall U.S. capability. Furthermore, as former Secretary Clifford pointed out in his presentation of the fiscal 1970 budget, the U.S.S.R. is pushing vigorously ahead with an R. & D. program for an advanced ABM system, although their ABM deployment around Moscow is probably somewhat smaller than originally

projected. Thus, it is likely that a Soviet military reaction, if any, to a Sentinel-type deployment is probably already in train and should not be affected by my hypothetical example of a decision to proceed with that type of system.

In June of 1968, the Soviets indicated that they were prepared to begin talks to limit both offensive and defensive strategic arms. This was some 18 months after President Johnson had originally proposed them, and some 9 months after the announced Sentinel deployment decision. This timing would not necessarily suggest a direct relationship between Sentinel and the talks. The Soviet agreement to talks followed closely on the U.N. resolution endorsing the Nonproliferation Treaty which includes a provision, article VI, in which parties to the treaty would undertake to pursue negotiations in good faith on effective measures relating to the cessation of the nuclear arms race as well as other disarmament issues.

EFFECT OF SENTINEL DECISION ON SOVIET ATTITUDE TOWARD TALKS

Since June of 1968, the Soviets have been pressing for initiation of these talks, despite the fact that the United States was, until last month, proceeding with the full Sentinel program. On the other hand, there has been no slackening of the Soviet interest during the past month while the ABM deployment decision has been under review. In light of these factors, it would be my judgment that the assumed example to proceed with Sentinel would have little, if any, impact on the Soviet interest in negotiating strategic arms limitations.

It is my personal judgment that to proceed with a greatly enlarged, or so-called thick ABM system, would have a harmful effect on the outcome of strategic arms limitation talks. It would be looked on as an escalation of the strategic arms race started after the Soviets had agreed to proceed with the talks. They would probably wish at the very least to review their decision to go ahead and might decide to go back out until such a time as they had deployed sufficient offensive forces to insure penetration of such a thick U.S. system.

The effect of any actual ABM deployment on the outcome of the negotiations would depend on the scope and characteristics of the system, the timing of the negotiations, and the types of other armaments which would be involved in any agreement. After all, it would be some years before any U.S. ABMs would actually be deployed and several more years before any U.S. ABM system could be operational.

I hope the committee will realize that present circumstances may make it somewhat difficult for me to answer some of your questions in a fully responsible way.

I am operating under three constraints. First, newness at the job—I have yet to receive my first paycheck. Second, I am a principal participant in the current presidential review of the ABM matter and therefore under certain wraps. Third, I expect to have a role in strategic arms limitation negotiations which I believe are upcoming and as such should try not to telegraph our present thinking about negotiations to the Soviet Union. But I do appreciate the importance of better public understanding of this very important issue facing the United States and, subject to the above constraints, I will do my best to be a responsive witness.

Mr. Chairman, that completes my prepared statement.

Thank you.

Senator GORE. Thank you, Mr. Smith.

As chairman, I would like to say that in negotiating with Mr. Smith for his appearance, I took the responsibility of assuring him that he would not be pressed on any matter outside the perimeter of the guidelines he has set for us.

Senator Fulbright?

Senator FULBRIGHT. Mr. Chairman, in spite of what you say, Mr. Smith, I am not quite clear about those guidelines.

SECRECY OF ABM MATTER NOT SEEN

It never occurred to me, Mr. Smith, that this subject, in view of its background, is a matter involving great secrecy and security. It seems to me this has become a matter—for example, in view of what is going on at Libertyville, Ill., and even into the courts as to whether this can be deployed—which ought to be discussed in the fullest candor and frankness.

I would gather from one or two statements you made, one for example: "I would think that a decision to resume some such deployment at this time would not prejudice the prospects for strategic arms limitation talks." It is very hard for me to accept that and it seems to me that the deployment would be in violation or contradiction of article VI of the Nonproliferation Treaty which we have already discussed. I am frank to say I don't quite see why you feel restrained to discuss this matter in public.

This is a matter, I think, which involves everybody and I don't see any great secrecy about it. It is not a CIA matter.

There isn't any secret about what is involved. There is great discussion about whether these systems are worth anything, whether they are effective, or a complete waste of money. These are the things the taxpayers and everybody are interested in, and they aren't secret.

GUIDELINES OF TESTIMONY

Senator GORE. Mr. Chairman, I would like to clarify the perimeters to which I made reference. They were, any testimony with respect to conferences with the President on the decision now under consideration and, secondly, any probable or future position which the administration would take in negotiations. That was all to which I referred.

Mr. SMITH. That is right, sir.

Senator GORE. I understand, Mr. Smith, you are prepared to testify on the subject matter of your statement.

Mr. SMITH. That is correct and, Senator Fulbright, I would be very glad to try to give you my judgment on the point about the relationship between article VI and any proposed ABM decision. I would merely like to stay away from the subject of my input into the current Presidential review of the fiscal 1970 budget.

On other matters, I will try to give you the best answers I can.

Senator FULBRIGHT. Of course, it was my impression that these hearings and these discussions were designed to influence the President's decision. I wouldn't be so interested in having you here and having this discussed if I didn't think it would have an influence on his decision as to what to do. He said he is going to announce the decision

next week. It is rather late, but I would hope that this brief exposure might have an influence on his judgment, and I think it might. These decisions are not all one way. These decisions are often very close as to whether you go forward or not. Many billions of dollars are involved and I would like to have our discussion as frank as possible.

Let's start.

IS SENTINEL DEPLOYMENT A VIOLATION OF ARTICLE VI?

Do you not think that the deployment of the Sentinel would violate the spirit of article VI, assuming we are going to approve and ratify the Nonproliferation Treaty?

Mr. SMITH. No, sir, I don't think so for several reasons. Article VI was contained, was inserted in the treaty, as I understand it, after the United States had taken a decision to go ahead with the Sentinel program. Countries who urged this upon us realized that at that time this decision had already been taken, and I think that regardless of what decision is made on the fiscal 1970 budget you cannot expect to see actual deployment of an ABM system for years, not months but years. And, therefore, it seems to me there will be ample time for us to find out in negotiations with the Soviet Union if some control arrangements are possible, in which event the decision on ABMs would be subject to modification in the light of that agreement.

Senator FULBRIGHT. The trouble is, from a psychological point of view, if we proceed it could well induce the Soviets or anyone else to believe that we are not serious about article VI, that it was just a little window dressing. I read in the morning paper in Mr. Kraft's column that the people in Paris are beginning to believe we are not serious about the negotiations in Paris. There are areas in which a psychological influence comes in, and I have a feeling that not everybody is quite as convinced of our righteousness as we are, that there is some difference of opinion in other people's minds as to what the United States has in mind.

I wish everyone thought us as good and kindly and peaceloving as we think we are, but they don't. And I think to proceed with this system is inconsistent with article VI. Article VI was put in at the request of the small nations. One principal inducement to sign the treaty was to get the United States and Soviet Russia to slow in some way the arms race which the smaller nations can see they are going to be caught right in the middle of.

ABM DECISION NOT YET MADE

It would seem to me from what you and Secretary Laird say that the decision has already been made to go forward with the ABM as far as the administration is concerned, unless some pressure develops as a result of these hearings.

Mr. SMITH. May I comment on that conclusion, Senator?

Senator FULBRIGHT. Yes.

Mr. SMITH. I would say categorically that a decision has not been made. I don't want to leave any impression that anything I said indicates it has been made. I think that on the article VI question, sir, there is a specific focus at this time on the ABM decision, but it would be just as logical to say we should consider stopping other programs to be

within the spirit of article VI. There are a number of other ballistic missile——

Senator FULBRIGHT. This is the one that is critical. This was the point made by Mr. Laird, that many different kinds of esoteric systems which are not under consideration by this committee might be considered. But the one that is critical is this one.

VOTE ON SENTINEL APPROPRIATIONS

Unfortunately I have to go to a very important meeting and I want to ask this question: What is the present situation with regard to finances? Will the Senate or the Congress have an opportunity to vote against an appropriation for the deployment of this system, or do you already have enough money to proceed with deployment? What is the fiscal situation?

Mr. SMITH. I think, to get a precise answer to that, sir, you should ask the Department of Defense.

My understanding is that in the fiscal 1970 budget presented by President Johnson there was $1.8 billion for the continuation of this program, and I would think that this Congress, passing on fiscal 1970 appropriations, if it cares to, would have an appropriate opportunity to affect the on-going course of the ABM.

Senator FULBRIGHT. Is it correct to say that Defense now has approximately $1 billion available to buy sites and to start deployment?

Mr. SMITH. I would like to check that figure and give you an answer.

Senator FULBRIGHT. Do you know, Mr. Fisher?

Mr. FISHER. No, sir; I don't.

Senator FULBRIGHT. You don't.

I was wondering if we would have an opportunity—other than persuasion in meetings like this—to vote on this matter. I suspect if we had a right to vote at the present time, why, we could perhaps stop this but, of course, many things can intervene. If the escalation of the war in Vietnam intervenes, if we get back into a high war fever, why, of course, all of this could go out the window. These matters are interrelated. It is very disturbing that no progress is being made in Paris, because if the war is resumed at a high level, then all efforts at negotiation would be finished for the foreseeable future.

Senator COOPER. Would you yield at this point?

Senator FULBRIGHT. Mr. Chairman, I hate to leave and I will try to come back.

Senator COOPER. Will you yield?

Senator FULBRIGHT. Yes; I will yield.

Senator COOPER. I think it is correct to say that last year the Congress appropriated $1.2 billion toward the ABM system.

(The following material was subsequently submitted:)

It is ACDA's understanding that fiscal year 1969 Department of Defense budget provided a total of $962 million for ABMs—$311 million for R. & D.; $346 million for procurement; $266 million for construction; and $39 million for operations.

SOVIET REACTION TO HARD ABM SYSTEM

Senator GORE. Mr. Smith, you made the point in your statement that the Soviets did not, to your knowledge, noticeably react to the decision of the United States to deploy a so-called thin anti-ballistic-

missile system. You will recall that this program was announced as a basis of a thin defense against a possible threat from China. Now, I wonder what you think the reaction of the Soviet Union would be if the United States modified this program so as to be a specific defense against a possible missile assault from the Soviet Union? In other words, if it is changed from a thin defense against possible threat from China to a hard defense against offensive missiles from the Soviet Union, what would be their reaction?

Mr. SMITH. Well, Mr. Chairman, as I recall Mr. McNamara's speech in the fall of 1967, although he, I think, emphasized the Chinese threat pointedly, he also made the point that there would be additional benefits from this system in terms of protecting U.S. retaliatory capabilities. If, as a result of this review that is going on, there was any change in the priorities for which an ABM system might be intended, I would not think that it would have a great effect on the Soviet mentality. They don't seem to place as much interest in defensive missile systems as we do. I think that they originally, as I recall it, did not even want to consider defensive missile systems as part of a strategic arms limitation talk. Their general attitude in the past has been, "Well, defensive missile systems don't threaten anybody. If you want to spend a lot of money on them, that is your business."

So my hunch is that if something of the present order of magnitude of the system was produced as a result of this review, I wouldn't anticipate a very significant Soviet reaction.

I think any reaction from the Soviet Union to our 1967 decision has already been put in train.

Senator GORE. I was speaking, however, of modification of that decision. At least we must assume that this would be an unknown factor. Would you agree with that?

Mr. SMITH. Well I think, yes, in general, sir. I think most of these judgments about what the Soviets might do in the future are speculative.

Senator GORE. Senator Cooper?

Senator COOPER. Thank you, Mr. Chairman.

I understand Mr. Smith is operating under some restraint, just having assumed his office, and also because you are participating, as you said, in the ABM review.

IMPORTANT TO OBTAIN ALL POSSIBLE INFORMATION

I agree with the Chairman, Senator Fulbright, that it is very important that this committee, the people, and the Congress get all the information we can because we are up against a deadline.

We were assured by Secretary of Defense Laird that this review of the ABM would go on for several weeks, until the middle or the latter part of this month.

Now, this week in his press conference, the President has said that the National Security Council would be meeting, as I understood yesterday, and he would make a decision next week. The only means we in the Senate have of giving our views is through this kind of consultation, and I think the hearings are the only means the people have of giving their views, and of obtaining adequate information about all the aspects and implications of this ABM system.

IS ABM DEPLOYMENT ANOTHER STEP IN ARMS RACE?

I will direct a few questions to you because you have had long experience in this field. You have long been connected with arms control. You have done good work in this field. You do consider, do you not, just from your own past experience and your general knowledge, that if the United States deployed an ABM system, whether it is thick or thin, then the Soviet Union in response, deployed such a system that it adds to and complicates the problem of reaching arms control? Do you agree it is a new venture, a new step, adding to the total problem of controlling the nuclear arms race?

Mr. SMITH. I think, Senator Cooper, if both the United States and the U.S.S.R. have defensive ballistic missile systems it doesn't make the problem of trying to negotiate strategic arms settlement any easier.

The fact, however, is that the Soviet Union does have a defensive missile system. The United States is now faced with the problem of whether it should continue with a decision of some months ago to also develop or open a so-called thin missile system.

Senator COOPER. I know in the course of this hearing we will have an opportunity to go into many, many different points but one of the great difficulties, I think we have had in the hearings thus far is that there were so many general statements made and so many contradictions made by those who represented the administration, the past administration, and those who represent this administration, that it is very difficult to get to the heart of any of these questions.

For example, you just said that the Soviet Union is deploying a system. We all know that, we know they have partially deployed a system of some kind around Moscow, but they never complete the testimony, including the statement of Mr. Laird by telling what kind of a system it is. So the implication is that the Soviets have deployed an effective system, one that is capable of defending the Soviet Union, and I think all of us who have been in executive sessions and have heard other testimony including the public statements of former Secretaries McNamara and Clifford saying that the Galosh system around Moscow is not an effective system.

EFFECT ON SOVIET WILLINGNESS TO NEGOTIATE

I am not here to make a speech now, but you have said you did not think the decision to deploy a U.S. system had any effect upon the willingness of the Soviet Union to negotiate.

Mr. SMITH. Yes, sir; that is the way the evidence appears to me. The decision was taken in September of 1967, and the Soviet willingness has persisted; the Soviet willingness developed from that time and has persisted since then. They have not indicated they want to pull off from serious negotiations because of the fact that we had planned to deploy a Sentinel system.

Senator COOPER. Last year we were told by representatives of the administration and by our own colleagues of the fact that the Senate vote approving funds for this ABM system brought the Soviets into negotiation.

EUROPEAN ATTITUDE TOWARD U.S. ABM DEPLOYMENT

You have said you do not think that the Europeans have any particular concern about the deployment of a U.S. system. Isn't it a fact that some of the NATO countries have indicated if the United States should deploy a system that it could mean to them that the United States will isolate itself from its interests in Europe? Some of these countries believe we might not be as interested in NATO defense as we have said we were heretofore.

Mr. SMITH. The evidence I have seen, Senator Cooper, is that there are two schools of opinion. I think there are some serious people who think that to the extent that the United States has retaliatory capability that is less vulnerable as a result of a defensive system, it would increase the credibility of the deterrent to Soviet attack on Western Europe. I think there are some people who feel if the United States moved into a large defensive posture it might indicate some turning toward a fortress of America concept.

Senator COOPER. That is what I am trying to bring out.

Mr. SMITH. But I don't believe there are any——

WHAT IS INTENT OF AN ABM SYSTEM?

Senator COOPER. I wish to turn to the conflicting statements.

You talked about the thin system which is now being discussed, yet do you know that last year when there was testimony before the Senate Armed Services Committee both Senator Stennis, who is now the chairman of the Armed Services Committee, and Senator Russell, the then chairman of the Armed Services Committee, and both serving on the Appropriations Defense Subcommittee, both stated their opinion that they didn't consider for a moment that this was intended as a thin system against China? In their view it was a building block for a major thick system against the Soviet Union and if they had only a thin system they wouldn't support it. The response from the Defense Department representative testifying at that time, General Johnson, agreed with him, that it was the beginning of a thick system.

President Nixon said in one of his recent press conferences that he did not consider the ABM—I don't want to quote him improperly, but in substance it was that he evaluated it more than a thin system against China.

Now, what is it? We have all these conflicting statements. Is it a thin system or is it a thick system? Is it considered to be a stepping stone, a building block for a thick system? With the experience that you have can you tell us what it is? These are the questions—the contradictions which keep the Congress uninformed, and keep the country uninformed.

Mr. SMITH. First, let me try, sir, to clarify a little bit on that.

The only system that I can speak to definitely, as you referred to it, I take it, is the Sentinel system that was announced in 1967. And President Nixon's statement about that, to which I think you referred, was that "I do not buy the assumption that the ABM system, the thin Sentinel system as it has been described, was simply for the purpose of protecting ourselves against attack from Communist China." I think this goes to the point I tried to make to the Chairman, that although the Chinese rationale was the one that was given first, Secretary

McNamara pointed out that there would be other benefits from this system, such as the possibility of some control against accidental launches, and also some effect on strenghtening the invulnerability of our retaliatory forces. So I would say that that is the present rationale for the past concept.

Now, I cannot at this point go into what might come out of the present review.

Senator COOPER. I would suggest, myself, that the answer may be that the kind of system justified is whatever the Pentagon believes it can get through the Congress. I have one more question. I have respect for you in view of what you have done in the field of arms control.

NEGOTIATIONS BEFORE DEPLOYMENT

Could you answer this question, and I close on this: Senator Symington has talked about costs, I would say for myself, I want to make my position clear, no matter what it costs, if any ABM system were found feasible and necessary to protect this country I would be for it. But Senator Symington—and I will not impinge on his ground—I know he will go into the details of costs, has said the ABM will cost much more than has been suggested by either the administration or by the witnesses. I must say, Secretary Laird kept himself very flexible when he was before us, about what the eventual costs might be.

But considering the costs, whatever they are, considering the importance of going fully into its feasibility which I would say is a matter of judgment, considering whether or not—whether deployment of an ABM would lead on both sides to a continuing spiral in the development of nuclear weapons, and in my judgment would make it more difficult to reach agreement on some arms control—and considering further the fact we have had just about as much briefing from CIA on this as those in the Department of Defense have, that there seems to be less of a threat now than there was a year ago—considering all these factors, would you say that it would be worthwhile for the administration to pursue negotiation, to see whether it is possible to get an agreement with the Soviet Union. Let us place part of the burden on the Soviet Union to make this decision as well as the United States. We should see if negotiations are possible, before deployment. Would you consider that a valueless proposal?

Mr. SMITH. That, Senator Cooper, is my understanding of what we are going to try to do.

As I suggested, there is no possibility that an ABM system can be deployed for years, even if you reaffirmed the decision taken in 1967. It will be years before any ABM weapons are deployed, and more years after that before any full system could be operational.

Now, it seems to me that it should not take us years but months to determine if the Soviet Union is seriously interested in entering into arms control arrangements with us in this field. So I would think that the way things will work out, even if there is an affirmative decision to continue some sort of a Sentinel program, that the evolution will work out as you desire, that a serious effort will be made to work out a negotiated agreement with the Soviet Union.

Senator COOPER. Well, Secretary Laird said it would be, as I recal, 1972, before this system would be operational. But I would just suggest if the Congress has already appropriated last year about $1.2

billion—I think the past administration has asked for $2 or $3 billion this year—it would be a trend set in motion which past experience shows makes it more and more difficult to reverse that momentum.

I have finished, Mr. Chairman.

Senator GORE. The Chair would like to call to the attention of the committee that the next three witnesses are prepared to give us a technical basis on which to reach judgments on some of the matters that have been introduced. I hope we can get to them before too long.

Senator Mansfield.

Senator MANSFIELD. Mr. Chairman, I will be brief. I have no questions to ask of Mr. Smith. I appreciate the fact that he has to, because of circumstances connected with the review, operate within certain guidelines. All I can say is, Mr. Smith, that I am glad to see you back in government again.

Mr. SMITH. Thank you.

FUNDS FOR RESEARCH AND DEVELOPMENT ADVOCATED

Senator MANSFIELD. You point out, and I quote, "Furthermore, as former Secretary Clifford pointed out in his presentation of the fiscal 1970 budget, the U.S.S.R. is pushing vigorously ahead with an R. and D. (research and development) program for an advanced ABM system, although their ABM deployment around Moscow is probably somewhat smaller than originally projected."

I want to reenforce what Senator Cooper has said that those of us who have questions in our minds about the ABM are not against the continuing of the research and development aspects. We are aware of the needs for the security of this country, and we are prepared to vote any sums which can be, which are, necessary for projects which are necessary to achieve that purpose.

I would point out that external security which, of course, would be the main factor applicable to an ABM system, either thin, which is doubtful there, but certainly with a thick system, should go hand in hand with internal security, and both will take money, and the question will arise, where is this money coming from?

If we spend so much on a program which may, I emphasize the word "may," be of doubtful value, and that program escalates in expense, and the Soviet Union, for example, matches us dollar for ruble, the question in my mind is if at the end of a period when we spend $10 or $50 or $100 billion or more, and the Soviet Union spends as much comparatively speaking, would we be then at the same point that we are now vis-a-vis weapons of this nature?

ACTUAL COST IS IMPORTANT

We want to know the facts about the actual cost above the $5 billion originally presented to us some years ago for a thin ABM system, which as you have indicated by using a direct quotation, the President of the United States has stated it was an idea that he had never bought. And I might say that a great majority of the Senate, regardless of their votes, likewise never bought such a flimsy excuse, such a thin excuse for a thin line.

But the cost is important, the validity. I understand that it is far from accurate or far from proven out, it will have to be proven, and

what we want to know are the facts. We want to become educated ourselves.

The questions I had in mind are not necessarily tied in with your testimony because you are new on the job this time. But it would be tied in more precisely with the testimony of the Defense and State Departments.

LINKAGE OF DISARMAMENT NEGOTIATIONS WITH OTHER FOREIGN POLICY PROBLEMS

I think that one thing ought to be made clear again, that that was a statement made by the President, that insofar as armament negotiations with the Soviet Union are concerned, that he is very much interested in seeing if they cannot be brought about to the mutual benefit of both countries, and I hope it is gotten across that the idea of a linkage with such negotiations is not a part of his desire to meet at an appropriate time or to have his negotiators meet, with their counterparts in the Soviet Union.

In other words, it is not necessary that the Mideastern situation, Vietnam, and other matters be necessarily tied in with disarmament. I make this point only to try to decrease the emphasis which has been placed on the word "linkage" and the interpretation given to it.

Thank you very much, Mr. Chairman.

Senator GORE. Senator Aiken.

INSURANCE STUDY OF MISSILE AREAS

Senator AIKEN. I have a couple of questions that may seem to have nothing to do with the proposed system, but I wonder if the insurance companies have made a study to see what effect the establishment of such a system might have upon the insurance rates on the surrounding territories?

Mr. SMITH. I can't answer that question, Senator. I would suggest the Department of Defense people can give you a straight answer to that. I do not know.

Senator AIKEN. I just thought there might be some change in rates, maybe for the better, although probably not.

CONCERN ABOUT DEFENSIVE MISSILE SITES

The next question is, you know many people get very very emotional at the thought of having a nuclear powerplant established in their area. Would you have that emotional concern with the establishment of the ABM? Would they be happy? Some of them have gone so far to say that everybody within 30, 40 miles of a nuclear powerplant will surely die. What would you say about an ABM base in their midsts?

Mr. SMITH. Well, you remember, Senator Aiken, very well, there was a tremendous concern when we first started to think in terms of placing nuclear powerplants near built up centers, and some of that feeling, I think, still persists, but on the whole, I think there is a fairly general acceptance now that nuclear powerplants are not intrinsically dangerous facilities.

If my reading of the newspaper is correct, it seems to me there is a good deal of discontent in certain built-up parts of the United States with the concept of having defensive missiles sited adjacent to these cities.

DEPLOYMENT NOT URGED

Senator AIKEN. And did I read somewhere that about 50 contracting concerns expected to participate in this program?

Senator GORE. 15,000.

Senator AIKEN. Fifteen thousand. I don't know how many ciphers to put on there. I hope it won't be necessary to go ahead with deployment. Nobody objects to the research and development going on because that fits in with other programs reasonably well, and I am sure we will learn a lot which we might not otherwise find out, things that we ought to know. They certainly make for progress in the future, but rather costly progress. I don't think I have any more questions.

Senator GORE. Senator Symington.

Senator SYMINGTON. Thank you, Mr. Chairman.

EFFECT OF THICK SYSTEM ON ARMS NEGOTIATIONS

Mr. Director, you say that the U.S.S.R. is pushing vigorously ahead with a research and development program. Let me assure you that many, including Senator Cooper and myself, have repeatedly mentioned that we too are for pushing ahead vigorously with a research and development program.

You also say that the ABM deployment of the Soviets around Moscow is probably somewhat smaller than originally projected. I believe you would be willing to eliminate the word "probably" based on the best intelligence we can obtain. If you have any different intelligence I wish you would let me know at another time.

I would again emphasize the problem of costs in this missile field. We have been "missile happy" in this country now for some years. Figures I have this morning showing costs of missiles the American taxpayer has paid for, that were later abandoned, and I am sure this figure is not complete, total $23,053 million; and I know of at least one system that is not included.

That is one of the reasons so many of us are interested in not wrecking the economy by excess, and very possibly unnecessary defense expenditures.

As I understand it, you do not believe a thin system, one designed against China, would affect our relationship with the Soviet Union; but you have also said: "It is my personal judgment that to proceed with a greatly enlarged so-called thick ABM system would have a harmful effect on the outcome of strategic arms limitation costs." Have I stated your position correctly?

Mr. SMITH. Yes.

Senator SYMINGTON. Thank you.

Senator GORE. Senator Williams.

EFFECT OF DEPLOYMENT ON ARMS RACE

Senator WILLIAMS. Mr. Smith, just one question: I think we are all agreed that whatever programs are needed for research we should continue. But my question is: In the event that a decision is made to process full steam ahead to deployment of these ABM systems, do

you think that could very well touch off another arms race and do you think we could stop it once we got it started?

Mr. SMITH. Senator Williams, I think that if a decision were taken now which was of the same order of magnitude as the decision taken back in September of 1967, to which presumably the Soviets have already reacted, if they are going to react, I would think that probably would not set off a new stage of the spiraling arms race.

Senator WILLIAMS. But supposing we decided—we know we are going to proceed further than that—to proceed with full deployment; you don't think that that would touch off an arms race?

Mr. SMITH. Well, if by full deployment, sir, you mean the amount of missiles that is included in the present Sentinel program, which is under review, and which the Soviets have had 15 or 16 months to look at, I don't think that would set off a new spiraling arms race. The Soviets since that announcement in September of 1967 have been increasing their strategic capabilities substantially and so I wouldn't think that if the program or something like it that has been in suspense for a month was merely put back into existence that should not be, I wouldn't think, the occasion of a feeling on the part of the Russians that something new had happened.

Senator WILLIAMS. Thank you.

Senator GORE. Senator Pell.

Senator PELL. Thank you, Mr. Chairman.

DIRECTION OF SOVIET ABM SYSTEM

Mr. Smith, in the prepared statement that Senator Gore had and which for the sake of speed he did not read in its entirety but there was one telling point raised. I would like to read it into the record: "The public has recently been told by responsible officials that the limited Soviet anti-ballistic-missile system now deployed around Moscow has the dual mission of protecting Moscow from both United States and Communist Chinese missiles. This statement flatly contradicts what the Foreign Relations Committee was told by another equally responsible source just a few days ago."

I am aware of both of these views, and they both have been expressed publicly. Would you tell us what your view is?

Mr. SMITH. Well, Senator Pell, since this does get into U.S. intelligence capabilities, I would urge you to put that question to someone whose responsibilities go to the intelligence business. I have heard, as you say, these two estimates made. I would hesitate to tell you which, in my judgment, our present intelligence supports.

Senator PELL. All right.

I will follow your advice on that, although it is frustrating when both views have been expressed in a very responsible way and in the public press as well. I do think the public has a right to know in what direction the Soviet ABM system is directed. I would hope the administration would give thought to letting a single view on that matter come forward.

MISSILES ON THE SEABED

Another point that comes up is this question about seabeds. While it is very important to get on with ABM talks, we don't have quite the pressure of time as we do with regard to missiles on seabeds. Am I not correct in saying that we had to postpone a meeting of the 18-

nation disarmament committee a couple of days ago, because we didn't have a formulated Government policy in this regard?

Mr. SMITH. Well, the reason for our requesting a postponement was that I had taken over this function a matter of 2 or 3 weeks ago. The President of the United States was out of action as far as decisional processes in the United States all of last week, and it seemed to us a little bit unrealistic to expect to put together a position between the day before yesterday and today, and so we thought it made more sense to ask for a little more time, and among the items, as you point out, that will be considered is this whole question of seabeds.

Senator PELL. Am I not correct in saying it is not just among the items but, if not the first substantive item on the agenda, one of the top items.

Mr. SMITH. I don't know in terms of order but in my personal judgment I think it is one of the most important items on this agenda.

Senator PELL. Right.

Now, as I understand, you will be going to this meeting on the 18th of March, a little under 2 weeks, and, in addition, to one on this coming Monday. The Special Committee for the United Nations on the Seabed is meeting to discuss some more general aspects of this whole question. Therefore, it is very necessary that we develop a Government policy on this matter within the next few days.

Mr. SMITH. I hope we can get a decision very quickly; yes, sir.

TABLING A DRAFT OCEAN SPACE TREATY

Senator PELL. And pressing this matter a little further because even more imminent and, I think, involving more of a time factor than the ABM talks, which can be postponed for a few weeks, is this matter of missiles on the seabed. You said you would send up to us your views as to what our position would be when the time comes. I would like to again press in this regard and ask you if you feel we will be able to table a draft ocean space treaty along the lines that I have been pressing for a couple of years now or whether there will be merely a discussion of the problems involved?

Mr. SMITH. I wonder, Senator Pell, if I can ask my friend, Mr. Fisher, to respond to that since he has been following the ENDC preparations more closely than I.

Mr. FISHER. Senator Pell, on that I am not in a position to answer. We want to go as far as we can. The matter is still under discussion within the Government, within the structure of the NSC meetings, and this will be discussed promptly. I think you have some idea of the way that we will urge, but we will be in touch with you prior to the resumption of the ENDC.

Senator PELL. I would urge very strongly that you go ahead with what I understand is the original thought, actually table a draft piece of paper rather than have just a discussion of the problem. I ask the forgiveness of the chairman for taking up this time on a related subject, but there is even more of a time factor involved here. I would also ask permission to have inserted in the record at this point the portion of my own ocean space resolution relating to the peaceful uses of the seabeds.

Senator GORE. Without objection so ordered.

Senator PELL. Thank you.
(The excerpt referred to follows:)

[From S. Res. 92, relative to an ocean space treaty, introduced by Senator Pell Feb. 4, 1969.]

PART IV

USE OF SEABED AND SUBSOIL OF OCEAN SPACE FOR PEACEFUL PURPOSES ONLY

ARTICLE 25

1. The seabed and subsoil of submarine areas of ocean space shall be used for peaceful purposes only.
2. The prohibitions of this Part shall not be construed to prevent—
(A) The use of military personnel or equipment for scientific research or for any other peaceful purpose;
(B) the temporary use or stationing of any military submarines on the seabed or subsoil of ocean space if such submarines are not primarily designed or intended for use or stationing on the seabed or subsoil of ocean space; or
(C) the use or stationing of any device on or in the seabed or subsoil of ocean space which is designed and intended for purposes of submarine or weapons detection, identification, or tracking.

ARTICLE 26

1. Each of the States Parties to this Treaty undertakes to refrain from the implacement or installation on or in the seabed or subsoil of ocean space of any objects containing nuclear weapons or any kinds of weapons of mass destruction, or the stationing of such weapons on or in the seabed or subsoil of ocean space in any other manner.
2. Each of the States Parties to this Treaty undertakes furthermore to refrain from causing, encouraging, or in any way participating in the conduct of the activities described in paragraph 1 of this Article.

ARTICLE 27

All stations, installations, equipment, and sea vehicles, machines, and capsules, whether manned or unmanned, on the seabed or in the subsoil of ocean space shall be open to representatives of other States Parties to the Treaty on a basis of reciprocity, but only with the consent of the State concerned. Such representatives shall give reasonable advance notice of a projected visit in order that appropriate consultations may be held and that maximum precautions may be taken to assure safety and to avoid interference with normal operations in the facility to be visited. All such facilities shall be open at any time to the Sea Guard of the United Nations referred to in Part VII of this Treaty, subject to the control of the Security Council as set forth in such Part.

Senator GORE. Senator Javits.
Senator JAVITS. Mr. Chairman, thank you.

U.S. POSITION ON GOOD-FAITH NEGOTIATIONS

Mr. Smith, can you tell us what the administration has prepared now, or certainly immediately after the Senate ratifies the Nonproliferation Treaty, in the way of an approach to the Soviet Union that good-faith negotiations on effective measures relating to the cessation of a nuclear arms race—I am using your words—might require a standstill by them and by us wherever we are now on the anti-ballistic-missile except for research and development?

Mr. SMITH. I think, Senator Javits, in asking that question you are putting me in the position of trying to foreshadow what our negotiat-

ing position might be in the so-called strategic arms limitation talks, and I would hope that at this point we would not be asked to telegraph our position in that negotiation.

RESEARCH AND DEVELOPMENT ONLY

Senator JAVITS. Certainly not. But I don't think there is any restriction on me to state that I think that would be a very intelligent and a wise posture by my country.

Now, in answering all my colleagues, you have emphasized a negative point, to wit, that is epitomized by the sentence which appears in your statement, "I would think that a decision to resume such deployment," to wit, the thin anti-ballistic-missile system, "at this time would not prejudice the prospects for strategic arms limitation talks."

Now, that is in the negative; deployment wouldn't prejudice talks. But on the basis of a cost/time benefit ratio, calling attention to what you say yourself later, it should not take many months of negotiations to determine if strategic arms limitations appear to be negotiable, is it your view that on the basis I have just described, we could take the positive position that we won't go any further except with research and development?

Mr. SMITH. Well, at the risk of being, appearing to be, nonresponsive, there again, Senator, you are getting me into the area in which I have been making recommendations to the President, and I don't feel at liberty to disclose at this point what positions I have urged upon him. I am sorry.

Senator JAVITS. I won't press you on that. I am sure we would all agree that I should not.

RUSSIAN ABM DEPLOYMENT

I have two other questions. You used the word "deployment", both in respect to ourselves and in respect to the Soviet Union, regarding an anti-ballistic-missile system.

I call your attention to the fact that you say in your statement:

"Let us assume, as one possible example, resumption of the Sentinel deployment program. * * *"

That is ours. Then later you say:

"* * * the U.S.S.R. is pushing vigorously with an R. & D. program for an advanced ABM system, although their ABM deployment around Moscow is probably somewhat smaller than originally projected."

Now, would you give us the precise definition? We haven't deployed anything in the ordinary use of the word "deployment." Perhaps you are not at liberty to tell us, but are you telling us that the Russians have deployed something? In other words, let us understand clearly what you have in mind.

Mr. SMITH. Yes, sir. I am glad you picked that up. I think it is loose drafting on my part. I shouldn't have used the word "deployment" in regard to the American program. What I was talking about was a resumption of an American program which in some years would lead to actual deployment. In the case of the Soviet Union they have deployed a system around Moscow. Physically it is there, and it has an operational capability.

Senator JAVITS. Nevertheless, you are not advising us that you think therefore we ought to push hard for deployment in order to catch up with them, even as an essential element of the impending negotiation, is that correct? Is that a logical implication from what you say: it won't prejudice our position but you are not pushing us to do it in order to catch up with them?

Mr. SMITH. I have tried, Senator Javits, in this hearing not to make any specific recommendations about what the U.S. decision at this point should be. I think to answer your question precisely I would have to do that and I would hope that you would excuse me, please.

Senator JAVITS. All right.

INTERPRETATION OF ARTICLE III ON NONPROLIFERATION TREATY

Finally, there is some difference of opinion in the interpretation of article III of the Nonproliferation Treaty with respect to peaceful uses or peaceful employment of nuclear means by nonnuclear and nonsignatory nations.

I would like to ask you about the question of desirability. The interpretation is, which both administrations have made, Johnson and Nixon, that the international agreement for inspection, et cetera, must apply in the case of a nonsignatory nonnuclear nation only to the fissionable material which will be delivered by one of the major signatories, that is one of the nuclear powers.

The other nations, those who do sign must engage in international agreement for inspection of all their nonweapon uses.

Now, does that place a premium upon nonsigning and should some effort be made to mutually agree upon a different interpretation of article III in view of the fact that this seems to be the accepted U.S. legal definition of what is contained in the treaty?

Mr. SMITH. I wonder, Senator, if in the first instance I can ask Mr. Fisher to speak to that since he negotiated or had a firm hand in negotiating that, and then if there is anything further you want me to speak to I will be delighted.

Senator JAVITS. Fine, he is a great authority and I respect him.

Mr. FISHER. I think taking the position that a nonsigner would be cut off from all U.S. assistance unless it put all of its nuclear activities under safeguards would be interpreted by many nonsigners as undue pressure. They would use very often an uglier word, and I believe on that basis it would be counterproductive at this stage.

Senator JAVITS. So you would stay where we are?

Mr. FISHER. I would stay where we are. Now, I think over the long period of time as far as future programs are concerned we should point out that the obligations of article IV and article V of this treaty only run to signers, and that while we are not saying that we are inhibited from making assistance to nonsigners by article III, we can also point out we are not required to by articles IV and V.

Senator JAVITS. I think that is extremely helpful. I thank you and I thank the chairman.

Senator GORE. Mr. Smith, one question on my part. You say in your statement that your agency is participating in the deliberations of the National Security Council. Did you attend the session yesterday?

Mr. SMITH. I did.

Senator GORE. Thank you, you have been very helpful.

Messrs. Fink, Ruina, and Bethe will please come to the table.

(Discussion off the record.)

Senator GORE. The committee will come to order.

Gentlemen, on behalf of the committee, the Chair would like to thank each of you. The Chair indulges the suspicion that each of you may have had more apt pupils in the course of your career, but he would like to assure you, never have you had more interested and concerned students than you have before you now.

I will very briefly introduce each and I will place in the record extended biographies of the distinguished participants on the panel.

First, to give a preliminary statement, and the Chair would appreciate it if it would be possible on the part of the subcommittee to let each member of the panel make a preliminary statement and then as a panel respond to the questions of the subcommittee.

Mr. Fink served 4 years in the Department of Defense as Deputy Director of Defense Research and Engineering for Strategic and Space Systems, and Assistant Director of Defense Research and Engineering. He is presently general manager of General Electric's space systems organization, located in Valley Forge, Pa. He responded to the invitation of the subcommittee to come here and give us of his experience and his knowledge.

(The biographic sketch follows:)

DANIEL J. FINK

Daniel J. Fink is presently general manager of General Electric's Space Systems organization located in Valley Forge, Pennsylvania.

Prior to joining GE in late 1967, Mr. Fink served four years in the Department of Defense as Deputy Director of Defense Research & Engineering for Strategic and Space Systems; and Assistant Director of Defense Research & Engineering. In DOD, he was responsible for the research and engineering activities in strategic offensive and defensive weapons systems, the military space program, and major missile and test ranges. Typical projects included Minuteman. Poseidon, Nike X, Sentinel, and Titan III.

Mr. Fink's positions before he accepted his post at DOD included: numerous positions advancing to vice president and director of Allied Research Associates, Concord, Mass., from 1952 to 1963; group leader-aircraft dynamics, Bell Aircraft, 1949–1952; and as an engineer with Cornell Aeronautical Laboratory, Inc., 1948–1949.

In his current position with GE, he is responsible for a 5500-man organization involved in research, development, and production of space vehicles for both DOD and NASA.

Mr. Fink has a B.S. and M.S. in Aeronautical Engineering from the Massachusetts Institute of Technology, and in 1967 he received the DOD Distinguished Public Service medal.

He is currently a member of the DOD Defense Science Board.

STATEMENT OF DANIEL J. FINK, FORMER DEPUTY DIRECTOR OF DEFENSE RESEARCH AND ENGINEERING, DEPARTMENT OF DEFENSE

Dr. FINK. Thank you, Mr. Chairman.

It is indeed a privilege for me to appear before your committee on this very important topic of ballistic missile defense. During the years 1964 through 1967, working first for Dr. Brown and then for Dr. Foster, I was the Deputy Director of Defense Research and Engineer-

ing, responsible, among other things, for our ballistic missile defense research and development program. It is my hope this morning that I can draw upon this experience, and about a year's reflection on the outside, during which time I have not been associated with the program, to describe for you the U.S. BMD program and some of the decisions and rationale for evolving this program over the years, leading ultimately to the Sentinel decision in 1967.

FUNCTION OF RADARS AND INTERCEPTOR MISSILES

Before initiating the description of our program, I believe a few general definitions are in order. All of the systems which we shall be discussing have two principal components: radars and interceptor missiles. The functions of the radars are to detect and acquire the incoming enemy ICBM [intercontinental ballistic missile] warhead, to track this object with sufficient accuracy that we know where it is going and can thereby intercept it, to discriminate the real nuclear tipped reentry vehicles from any other objects which may inadvertently or purposefully be accompanying it, and to track our own interceptor missile so that we know where it is precisely located during its flight and can be guided accurately to intercept. The interceptor missile itself is the second component of our systems and its functions is to carry and detonate our nuclear warhead close enough to the incoming enemy warhead to guarantee destruction of the enemy's weapon.

Senator GORE. I am violating my own rule now, but what I understand you to say is that in order to counteract an incoming nuclear weapon we propose to explode a nuclear weapon in its path?

Dr. FINK. That is correct.

Senator GORE. Thank you.

Dr. FINK. All the systems we have ever considered seriously deploying have been of this nature. Approximately $4 billion of research and development have been devoted to these programs during the past 13 years.

TERMINAL AND AREA DEFENSE SYSTEMS

We have considered both terminal and area defense systems as well as combinations of the two, and I believe it would be useful to define these terms. A terminal defense system is one designed to protect an area a few tens of miles in diameter, quite representative of a metropolitan area. Looking at a map (not shown) of a section of our country the left-hand side in particular, the circles drawn around the various cities on the left, you can see them, they are very small in pink, show the areas that would be defended if a defense site, that is a terminal defense site, were located at these cities. A defense site, by the way, would normally consist of a radar and a set of interceptor missiles. An area defense system, on the other hand, is designed to provide defense by a single defense site over an area some hundreds of miles in diameter providing a defense "footprint" as shown on the right-hand side of the chart; in other words, that area in the pink is an area that could be defended by a defense site located approximately in Detroit on that map.

It would take about a dozen or so area defense sites to provide some protection over the entire continental United States.

BACKGROUND OF BALLISTIC MISSILE DEFENSE PROGRAM

I would like to now go a little bit into history.

The U.S. ballistic missile defense program got its real start in 1956 when the Nike-Zeus system received its go-ahead. It is interesting to note that we started this defense system before any real offensive threat had yet appeared but with the clear recognition that an ICBM was feasible and if we could do it so could our potential enemies. The technical problems appeared extraordinarily formidable at the time and raised such questions as, can you hit a bullet with a bullet? How does one intercept a missile coming at you at 4 miles per second with another one traveling at about 1 mile per second? The system took the form of the assemblage of components. Each defense site would have consisted of separate radars to do each of the various functions I previously described and a number of Zeus missiles to perform the intercepts. As an R. & D. system it was successful in the sense that by 1962 the first ICBM target launched from Vandenburg Air Force Base in California was intercepted by a Nike-Zeus missile launched from the research and development site at Kwajalein atoll in the Marshall Islands. While successful in performing a number of such intercepts, the development process revealed, however, two fundamental limitations.

First, the relatively slow speed of the Zeus missile made it necessary to commit an interceptor while the incoming offensive threat was quite far out. This meant that although it was a terminal defense it could not take advantage of the atmosphere to filter out even the lightest objects such as fragments of the booster. Second, it used separate mechanically slewed radars, such as the kind we are used to seeing around our airports, for each of the separate funtcions. Such radars take seconds to move their beams across the sky from object to object—a very long time considering the speed at which things would be happening. Since there could be many objects arriving, the system almost required a separate radar for each object aimed at a city. Thus, a typical defense site might contain as many as 30 radars and could still be easily saturated. I think it is worth pointing out that while a negative deployment decision was made on technical grounds, the development was extremely useful from an R. and D. standpoint. As a matter of fact, many of these radars are still used at Kwajalein atoll to test the efficacy of our own offensive missiles.

TECHNOLOGICAL DEVELOPMENTS OF THE 1960'S

In the early 1960s several technological developments were occurring which showed promise of eliminating the deficiencies of the Nike-Zeus system. First, a new type of radar called the phased array radar had been invented. With such a radar it is possible to generate many beams simultaneously and steer them electronically across the sky in a matter of microseconds, thereby permitting a single radar to handle a huge amount of traffic. Secondly, vastly improved data processing technology was becoming available and finally, a small very high acceleration missile called Sprint was conceived which, because of its speed, could withhold fire until the atmosphere filtered out most of the light objects. This technology was assembled into the Nike X system which was officially initiated in 1963. The Nike X system would consist of a very large phased array radar called the multifunction array radar (MAR)

which could handle all the functions of acquisition, discrimination, and target and missile tracking. Because such a radar is very expensive it was to be supplemented with a simpler phased radar called the missile site radar or MSR to handle some of the more routine tasks. The primary interceptor was now the Sprint missile although Zeus was still retained to provide some defense in depth.

In other words, as you look across from Nike-Zeus to Nike X the only common element is the Nike-Zeus missile because the Nike X consists of new elements.

PRIMARY OBJECTIVE OF BMD DEVELOPMENT PROGRAM

Throughout this period I would say that the primary objective of our BMD development program was to come up with a system that could provide major damage limiting capability against the Soviet Union. More than that, we were not designing a system against a threat existing at that time but, rather, we wished to be able to handle any penetration aid that we could conceive of as a means of defeating the system. The resultant Nike X system was one that the technicians could well be proud of, but yet it became increasingly clear that such a system would not be approved for deployment. The reasons were severalfold, but at least included the following: It was a very expensive terminal defense system which for a given amount of money could provide protection to some number of cities but leaving many totally unprotected, and it suffered the flaw of any terminal defense system; namely, that every piece contributes to the cost but the enemy can choose where to attack and only a small part of the system can be brought to bear to counter such an attack.

At the same time the threat that the United States was facing was changing in a number of ways. During the 1965–66 period the Soviet missile force was starting to grow at a rapid rate, giving us concern that not only could our cities be targets for attack but perhaps various elements of our strategic retaliatory force as well. At the same time, the Chinese were making dramatic progress with their nuclear program and it appeared that they would embark on an ICBM effort. Clearly if one was to defend against the Chinese during a period in which their missile force might be small, one would not wish to defend a few sites very heavily but rather would wish to provide some protection over the entire country.

AREA DEFENSE SYSTEM

As a result, the idea of spreading the defense over the country, leaving no free ride into undefended cities, took hold and the area defense concept evolved quite naturally. Two new components were introduced into our development program to provide this capability: first, a long-range interceptor missile, now called Spartan, which could fly several hundred miles carrying a nuclear warhead with a yield in the megaton range and thereby defend a rather considerable area; and, second, a new phased array acquisition radar that could pick out an attack essentially as far away as the radar horizon. For an ICBM this is over 1,500 miles, which gives us some 10 minutes to launch the Spartan—a very long time for today's computers. Let me illustrate how these components are put together to provide an area defense system. Figure 1 (see page 28) shows a profile of an area defense engagement. It can be seen that the perimeter acquisition radar now called PAR detects the incoming reentry vehicle at a distance of about 1,500

miles. It tracks this vehicle long enough to predict its trajectory, at which time a Spartan missile is launched and is guided to intercept by the missile site radar. The Spartan/MSR combination provides an ability to defend an area several hundred miles in diameter, as I indicated. To provide coverage over the entire United States we deploy a number of the PAR radars across the northern tier of the country to provide the total acquisition capability and a sufficient number of Spartan/MSR sites so that their overlapping coverage covers the entire United States.

You see there are in this case four PARs along the northern border of the country and those white bands represent——

Senator GORE. Would the attendant, as each chart is introduced, hold it up so our visitors in the audience can see the charts. This hearing is for the knowledge of the American people as well as the Senate.

Thank you very much.

Dr. FINK. In this chart (not shown) those white fan-shaped objects represent the detection range of the PARs, and these black footprints then represent the coverage by each of these Spartan/MSR sites and so there is a cover in a sense over the United States.

1967 SENTINEL DEPLOYMENT DECISION

This now leads us to the Sentinel deployment decision made by Secretary McNamara in 1967. Figure 2 (see page 29) indicates how Sentinel evolved from its predecessors—Nike-Zeus and Nike X. Specifically Sentinel consists of a few perimeter acquisition radars as depicted in the previous chart (not shown). Since these radars are important to maintain the full area coverage they are provided extra protection by Sprint missiles located in their immediate vicinity. In addition, there are sufficient Spartan/MSR defense sites located around the country to provide total area coverage. I believe that 16 such sites have been announced to date. This system was sized by a potential Chinese ICBM threat; namely, there were to be sufficient Spartan missiles to intercept a Chinese force of about 75 ICBMs that could be targeted any place across the country. In addition, an option was included to deploy additional Sprints around our Minuteman ICBM sites if and when desired.

If you look across now between Nike X and Sentinel, you see the missile site radar carries through; it now guides the Spartan. The Sprint missile still exists although its function is changed. You can't read the small print but in Nike X Sprint was for urban terminal defense and in Sentinel is for defense of the PARs and the Minuteman, and the Spartan is for the purpose of providing area coverage.

Let me further note a couple of other considerations that were brought to bear at the time of the Sentinel decision.

First, a review was made of our total research and development program to ascertain whether there was any development on the horizon that could make a major shift in our defense technology; for example, the way the phased array replaced mechanical radars in going from Nike-Zeus to Nike X. No such possibility was foreseen in the immediate future. Second, we reviewed how we would handle an anticipated evolving Chinese threat. The decision was made not to follow in the tracks of Nike X where we put every counter-countermeasure we could think of in the initial defense deployment to handle any conceivable penetration aid. Rather, Sentinel was designed to

handle likely initial attempts at penetration; for example, the high-yield warhead of the Spartan missile has an adequate kill volume to negate the deployment of penetration aids in the vicinity of the reentry vehicle. Similarly were the radar characteristics developed. This is not to say that the Sentinel system as originally deployed could not be defeated, but rather we reviewed the entire stable of penetration aids that we could think of and were satisfied that we could upgrade the defense technologically to handle them if and when they appeared.

We believed that we would know of the existence of such threats and only with a Sentinel system deployed in the field could our reaction time be short enough to incorporate the necessary product improvement.

SENTINEL SYSTEM VIS-A-VIS THE SOVIET UNION

Let me finally address the Sentinel system vis-a-vis the Soviet Union, since I know this is important to your consideration. The Spartan missiles in the Sentinel system could be launched to intercept ICBMs emanating from the Soviet Union as well as those from China and, as a matter of fact, one of the stated objectives is to handle an accidental launch by the Soviet Union. What, then, might the Soviet reaction be to such a deployment? Even if Sentinel worked perfectly there is simply not enough of it to threaten the Soviet deterrent. They could still exact tens of millions of U.S. fatalities. Because their force is now so large I believe their reaction, if any, would be in the form of penetration aids rather than in the addition of more and more destructive power. On the other hand, mustn't they worry about a numerical growth in our defense? In this regard, I can only say that unlike offense, which presumably works at any level, there is general agreement within the defense community that defenses cannot grow into larger and larger systems with any certainty of success at limiting fatalities to low levels. Thus there are strong technical arguments to limit the size of defense systems. Is there any value to a light defense such as Sentinel facing a very large offense? One aspect of my concern is that the lack of any defense might encourage the outbreak of conflict.

During the last few years the Soviet ICBM force has grown in numbers and presumably can become more accurate. Therefore, we must worry about all military applications of such force whether it be directed at our retaliatory forces, our missiles, our bombers, our command and control structure, or our ability to deploy forces overseas. Such attack might become more attractive if we are totally unprotected. A light defense complicates this picture and could provide assurance that adequate force survive as well as the time needed to protect our ability to retaliate. In this regard the defense could have a stabilizing influence of reducing the likelihood of such wars.

Gentlemen, that completes my description of the evolution of our ballistic missile defense program.

I will be happy to participate in the panel discussion at the end.

Senator GORE. Thank you very much.

(Two of the charts accompanying Dr. Fink's testimony follow: The others are on file with the committee.)

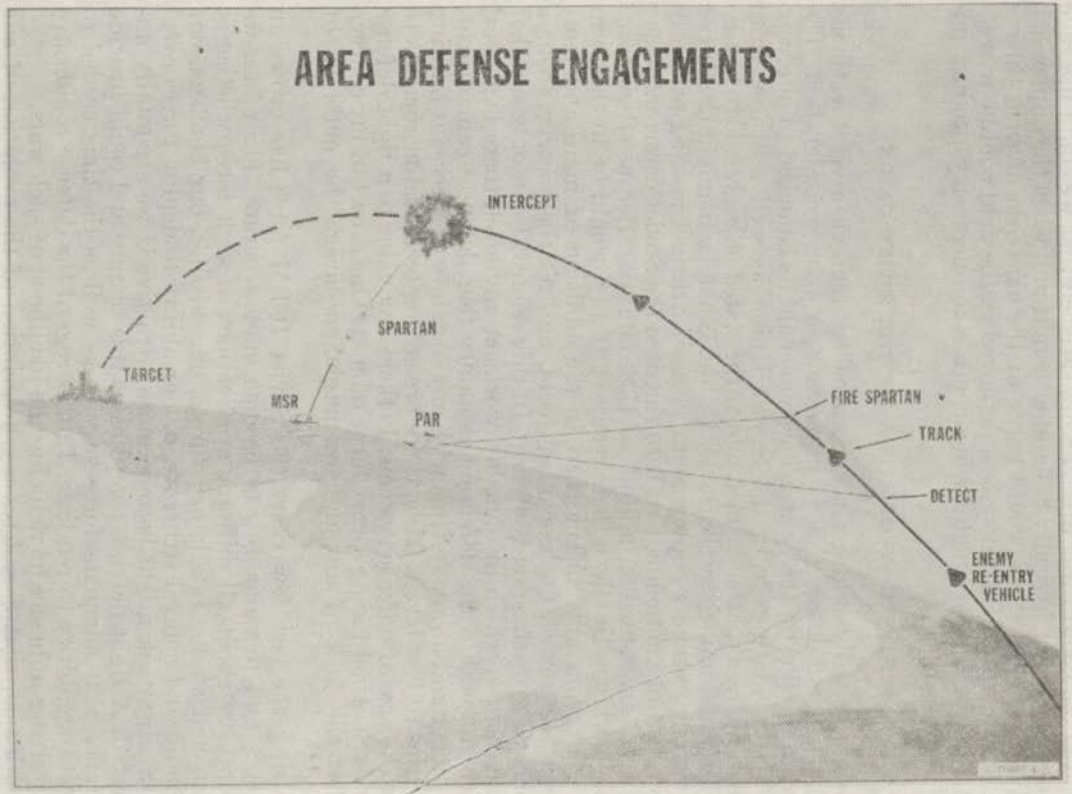
AREA DEFENSE ENGAGEMENTS
INTERCEPT
SPARTAN
TARGET
MSR
PAR
FIRE SPARTAN
TRACK
DETECT
ENEMY
RE-ENTRY
VEHICLE

FIGURE 1

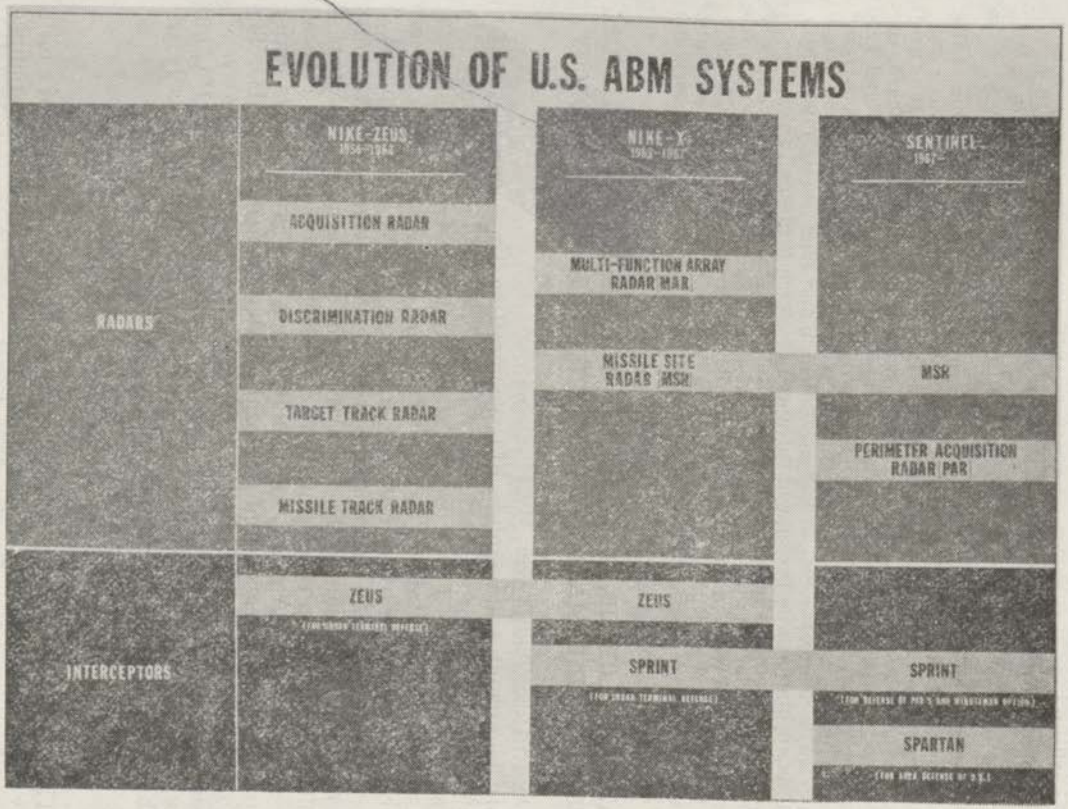
EVOLUTION OF U.S. ABM SYSTEMS
RADARS
INTERCEPTORS
NIKE-ZEUS
ACQUISITION RADAR
DISCRIMINATION RADAR
TARGET TRACK RADAR
MISSILE TRACK RADAR
ZEUS
NIKE-X
MULTI-FUNCTION ARRAY RADAR MAR
MISSILE SITE RADAR MSR
ZEUS
SPRINT
SENTINEL
MSR
PERIMETER ACQUISITION RADAR PAR
SPRINT
SPARTAN

FIGURE 2

Senator GORE. The committee has now heard from a man who spent 4 years devising the system now under consideration.

The committee will next hear from Dr. Ruina, currently a professor of electrical engineering at the Massachusetts Institute of Technology. Dr. Ruina, however, has had vast experience in the Government and in many scientific fields.

Dr. Ruina?

(A biographic sketch follows:)

JACK PHILIP RUINA

Currently maintaining a position as professor of electrical engineering at the Massachusetts Institute of Technology, Dr. Ruina nevertheless serves as a consultant to various government agencies: the Department of Defense, the Office of Science and Technology, the U.S. Air Force Scientific Advisory Board, the Department of Health, Education, and Welfare, and the Arms Control and Disarmament Agency. As an electrical engineer, Dr. Ruina served as Deputy for Research to the Assistant Secretary of the Air Force (1959–1960) and subsequently as Assistant Director of Defense Research and Engineering (1960–1961) until his appointment as Director of Advanced Research Projects Agency. Due to his many contributions in this position, Dr. Ruina was awarded the Secretary of Defense meritorious civilian service award. Following this position, he was, for several years, President of the Institute for Defense Analyses (1963–1965). Dr. Ruina was the recipient of the Fleming Award in 1961. His research and specialization have been in the fields of noise and communications theory and radar systems.

STATEMENT OF DR. J. P. RUINA, PROFESSOR OF ELECTRICAL ENGINEERING, MASSACHUSETTS INSTITUTE OF TECHNOLOGY

Dr. RUINA. Thank you, Mr. Chairman.

Mr. Chairman and members of the committee, I welcome this opportunity to state my personal views about Sentinel deployment. My views in no way, as I am sure you know, reflect the views held at the Massachusetts Institute of Technology or any of its laboratories where there is a spectrum of opinion on this issue. I have been involved in one way or another in the concerns about large defensive systems since I worked as a civilian in the Department of Defense from the period 1959 to 1963. For most of that time, I was Director of the Advanced Research Projects Agency, an agency which had as one of its major responsibilities research and exploratory development of BMD. The actual development of Nike-Zeus, Nike X, and Sentinel, the system described by Dr. Fink, was not the responsibility of the ARPA, but was assigned to the Army. Since 1963, I have followed closely the technical developments in this field.

NATIONAL DEBATE ON SENTINEL

The national debate on Sentinel is the first example I know of a military system becoming a matter of intense public debate not confined to small groups of experts or advocates of a special cause. I think it is significant that we have such a public discussion; it speaks well for the democratic process. I suppose that up to now the highly technical and classified nature of key issues involved in military systems precluded public involvement.

But, also, because almost all military programs were assumed to have high national priority, they received little critical questioning by the Congress or the press.

However, we are fortunate that within the executive branch and within the office of the Secretary of Defense, military programs are carefully examined and reviewed for technical feasibility, necessity, and costs—and, indeed, many programs which initially seemed attractive were curtailed after study. But I think that it is healthy to have questions on defense enter the public arena whenever possible and be judged in relation to other national issues and commitments. I think that on the matter of Sentinel we can have meaningful public discussion without involving ourselves with classified information.

However, public scrutiny brings with it certain pitfalls. Issues can look black or white and are sometimes simplified beyond useful recognition in order either to influence public opinion or to assure broad comprehension of sometimes very complex technical and strategic questions. Also, in the passion of debate, evil motives are attributed to both sides; and it becomes increasingly difficult to sort out the significant issues.

Advocates of Sentinel deployment are not part of a military-industrial conspiracy. Critics are not necessarily advocating unilateral disarmament of the United States. Expressing skepticism about need for a specific military system is not disloyal. Honest differences of opinion exist on the technical and strategic nature of the Sentinel system and its effectiveness.

RESEARCH AND DEVELOPMENT NECESSARY

I am also deeply disturbed that the argument about Sentinel has resulted in objections from some quarters to any efforts in ballistic missile defense—even research to help us gain knowledge about the technical issues involved. How can we make decisions about our own system and how can we assess what is going on in other countries without a deep immersion in all aspects of the technology? I believe that it is mistaken to view research, development, and evaluation as necessarily escalating the arms race. It is true that all of these are preliminary to development of any military system, but they are, also, preliminary to wise consideration of arms limitation.

One reason why it is possible to consider withholding Sentinel deployment and, for that matter, the thick Nike X deployment, and limiting our offensive forces, is that as a result of our intense R. and D. program we are very knowledgeable about the technology involved in both the penetration and defense fields.

HISTORY OF BALLISTIC MISSILE DEFENSE

Mr. Chairman, I have on the next few pages material which repeats pretty much what Dr. Fink has already given you, and I think in the interests of saving time I might skip further on in my statement.

Senator GORE. Thank you. It will be included in the record with your statement.

(The remainder of Dr. Ruina's statement follows:)

When intercontinental ballistic missiles were first developed in the mid-50s, they were considered by the public as the ultimate weapon against which there was no defense. However, after examining the technical situation, the Army developed a ballistic missile defense system called Nike-Zeus.

The system concept for Nike-Zeus was similar to that of Nike-Ajax and Nike-Hercules—two successful air defense weapons. The basic unit of the Nike-Zeus

was a battery consisting of radars, interceptor missiles, and computers all located in the vicinity of the area to be protected. Many such batteries were to be deployed around the United States, mainly to defend cities.

Nike-Zeus represented a magnificent piece of engineering, fully exploiting the technology of the day. It successfully met the challenge of being able to intercept and destroy an incoming re-entry vehicle. But the challenge to a ballistic missile defense system is more than being able to "hit a bullet with a bullet." A technologically sophisticated opponent like the Soviet Union could, and almost certainly would, develop a variety of penetration aids to confuse the system, increase the size of his force to saturate the system, or aim his missiles so that the nuclear explosion occurs outside the range of Nike-Zeus, thereby destroying population centers by nuclear fallout. So that in spite of the fact that Nike-Zeus was an engineering tour-de-force, its high cost and low effectiveness made it unattractive for deployment.

In the early 1960's, technology had progressed to the point where a greatly improved system could be developed. The Army discontinued further development on Nike-Zeus and started on Nike-X, a system utilizing the same basic system concept as Nike-Zeus but with vastly improved radars, intercepting missiles, and computers. The result was again a remarkable engineering development. The full Nike-X is intended to handle a far larger and more complex attack than Nike-Zeus.

However, as defense system technology improved, the technology of the offense also progressed. Again because of the high cost of the system and our estimates of the relative ease with which the Soviets could penetrate the system, the Government has not deployed Nike-X. It is interesting, however, that a new argument entered the debate on Nike-X deployment; namely, that since any ballistic missile defense system that we or the Soviets are capable of building can be penetrated, it was almost certain that the opposing side would build his strategic offensive forces to have assurance of this capability. Deploying ballistic missile defense on either side therefore would escalate the arms race, encourage possible miscalculations, increase arms cost, and yet provide neither country with any additional military security.

Dr. RUINA. Sentinel, the system that has been authorized for deployment to protect us against a possible Chinese ICBM attack, is a by-product of Nike X, and I think Dr. Fink demonstrated that extremely well.

REASONS FOR DEPLOYING SENTINEL

It uses some of the components of Nike X, but it uses them sparsely, and that is why it is called a thin system. It is thin in the number of components it uses; it is thin in cost, relative to Nike X, and it is thin in capability. But the missile force it is designed to protect against; for example, the Chinese missile force, is presumed to be thinner still.

I think it should be made very clear that deploying Sentinel against the Chinese may have some merit, but that there is universal agreement that deploying it to protect our population against a possible Soviet attack makes no sense at all.

Other reasons given for deploying Sentinel are that it can offer some protection of Minuteman sites against Soviet attack and that it can protect us against an accidental Soviet or Chinese missile launch. I would, however, like to spend the rest of my time or at least in the statement on the main reason given for deploying Sentinel, and that is for protection of the population against a Chinese nuclear-armed intercontinental ballistic missile force.

At this point in time we do not need a ballistic missile defense system against China for the simple reason that they do not have any intercontinental ballistic missiles. There is general agreement that eventually the Chinese will have the capability of penetrating Sentinel

with relative ease. It may be anywhere from 3 to 10 years, depending on who judges, from the time that the Chinese have a deployed nuclear force to the time that they can discount the existence of Sentinel. Of course this judgment includes a judgment of the intensity of the likely Chinese efforts. What I would like to do is examine the usefulness of the Sentinel in this interim period.

DESIGN OF SENTINEL SYSTEM

The system is designed to provide area defense, as Dr. Fink described, and that is, about 15 batteries can protect all of the United States and not only specific geographic areas within the country. It can do this because it utilizes a long-range Spartan interceptor missile, capable of intercepting attacking ballistic missiles hundreds of miles from the interceptor launch point. But the system suffers one great disadvantage; it cannot effectively use the earth's atmosphere to help sort and classify incoming objects. The result is that it is relatively easy for an opponent to deceive, exhaust, or otherwise penetrate the Sentinel system, and I believe Dr. Bethe, in his statement, will elaborate on some of the penetration techniques.

This is not to say that the Chinese after they get a reasonable missile force, will have an easy time neutralizing Sentinel. For them to design missiles which have high confidence of nullifying Sentinel would require a very extensive development and testing program. This is far more difficult than achieving low or medium confidence of penetration.

I would like to add that for the Chinese to have a credible nuclear threat against the United States all they need is a system with low or medium confidence in penetration and it might not be their aim to achieve a high confidence penetration system.

If you accept this assessment of the capabilities of Sentinel, then the judgment you must make is whether the deployment of the system gives sufficient advantage in our dealings with the Chinese to warrant the cost of the system. For example, during a transitional period in Chinese missile deployment, they might have 40 missiles, which they could launch against the United States and perhaps these missiles will have very crude untested penetration aids. Because of the existence of Sentinel it might be possible to protect ourselves against all but five—with, of course, some probability that more or less might penetrate. I might say the number five I pulled out of the hat, but I consider it a perfectly reasonable number. It means perhaps as many as four or five cities are vulnerable or might be destroyed in case of a nuclear attack.

What difference might this make for U.S. policy and security if this system cannot prevent those five from coming in. In other words, we don't have a total damage denial capability.

"DAMAGE LIMITING" INSURANCE

Another possible reason for Sentinel is that during its period of effectiveness, it would offer a kind of "damage limiting" insurance in the small chance that the Chinese do attack the United States with intercontinental ballistic missiles. But the probability of a Chinese attack, which would be suicidal and totally irrational from any point

of view, considering the size of our missile force, must be weighed together with the degree of protection we have from Sentinel and its cost.

EFFECT OF MISSILE DEFENSE ON ARMS AGREEMENT

You will also want to consider very carefully the implications of any U.S. deployment of ballistic missile defenses for the viability of a future agreement controlling the arms race in general. The current ballistic missile defense system around Moscow is sufficiently minor, we are told, in its capabilities so that it will not significantly unsettle the calculations of conservative U.S. planners. But were the Soviet Union to insist on deploying a system equivalent to the initial Sentinel, U.S. agreement on an offensive weapon limitation would be more difficult to attain. Thus the risks of deferring a U.S. system with a significant number of interceptors should be weighed against the complications that deployment might pose for our arms negotiators.

Finally, it should be noted that the authorized Sentinel system is intended to defend against ICBMs but this is not the only way the Chinese can deliver nuclear weapons on U.S. targets. Low flying aircraft, submarine, or ship launched ballistic or cruise missiles may be in the Chinese inventory in the next decade. An effective defense against one kind of weapon provides incentive for the offense to develop other strategic systems which may have easier entree. If ballistic missile defense has merit, it must be considered in the context of a balanced defense.

I have tried to outline what I think are some of the key issues involved in Sentinel deployment. I hope that my views are helpful to you in your deliberations.

Thank you.

Senator GORE. Thank you, Dr. Ruina.

The recipient of the Nobel Prize for physics in 1967, one of the world's greatest theoretical physicists, Dr. Hans Bethe, will now give his statement.

(A biographic sketch follows:)

HANS ALBRECHT BETHE

As Director of the Theoretical Physics Division of the Los Alamos Scientific Laboratory from 1943–1946, Dr. Bethe was one of the leading architects of the design of the atomic bomb. Since that time, his role as government advisor has ranged from serving as informal Presidential consultant to official consultant at the Los Alamos Laboratory (since 1947) to membership on the President's Science Advisory Committee (1956–1959). Dr. Bethe has been an influential advocate of nuclear disarmament, participating in the Geneva test-ban negotiations in 1958 and 1959 and continuing, without fanfare, to lecture and write about the necessity for control of our nuclear destructive capacity. The breadth of his contributions to physics has led to his selection as recipient of the Nobel Prize for Physics in 1967. Though perhaps Dr. Bethe's best known achievement in physics was the theory of energy production in the stars, he is also noted for his contributions to the theory of nuclear reactors. He developed the first theory of electron-positron pair creation and clarified the interaction processes of charged particles. In 1935–1937, Dr. Bethe, with two collaborators, wrote *Reviews of Modern Physics*, a book which remained a standard nuclear physics text for fifteen years.

The many honors rendered this remarkable scientist attest to his contribution to scientific thought in our times. Dr. Bethe has been twice the recipient of the New York Academy of Science's A. Cressy Morrison prize (1938–1940), once the Presidential Medal of Merit of 1946, the National Academy of Sciences' Henry Draper medal (1948), the Max Planck model (1955), and the Atomic Energy Commission's Enrico Fermi Award (1961).

STATEMENT OF DR. HANS A. BETHE, PROFESSOR OF PHYSICS, CORNELL UNIVERSITY

Dr. BETHE. Thank you, Mr. Chairman.

I welcome this opportunity. I will deviate somewhat from the prepared text which you have in your hands.

I have no criticism of the components of the Sentinel system as described by Dr. Fink. I believe they are well designed and I assume they will work as designed. Nor am I bothered by the safety aspect of the nuclear weapons deployed in the system.

I am worried about the possibility of penetrating the system, and I want to quote former Defense Secretary McNamara:

"It is important to understand that none of the ABM systems at the present or foreseeable state of the art would provide an impenetrable shield over the United States. * * * Let me make it very clear"—I am quoting Secretary McNamara—"that the cost in itself is not the problem: the penetrability of the proposed shield is the problem."

PENETRATION AIDS—BALLOONS

I shall discuss some of the penetration aids which the offense can use with their ICBM.

The first such aids are balloons. They can be made very thin, for example of mylar, and thus can be made to weigh only one or a few pounds. The outside surface has to be coated with metal, such as aluminum, but the coating need not be very perfect. The coating is to make the balloon reflect the radar waves so that the balloon appears to the radar like a reentry vehicle. If the shape of the object makes a difference to the radar the RV itself—reentry vehicle—can be surrounded by a balloon after the missile completes the ascent.

The balloons would all be folded in small packages while the missile goes up through the atmosphere and would then be released and inflated. If they are simply released, they will follow the same trajectory as the reentry vehicle. To provide confusion for the radar, it is necessary to disperse the balloons so that they make well separated targets for the radar. The Chinese would have to learn this technique, but they could do so by using their medium-range ballistic missile for launching the balloons.

Balloons have a somewhat bad name among missile experts because it is rather difficult to put them accurately on a specific trajectory to hit a specific target. This, however, is not a requirement in the case of Sentinel. The doctrine of Sentinel, as far as I understand, is to protect the entire country, and this means intercepting any threatening object. This would mean that any balloon, no matter what trajectory it follows, must be considered a target by Sentinel, and a Spartan missile must be sent against it. In fact, one could imagine the Chinese making an attack in which they only send over balloons, no warheads at all. The balloons would draw the Sentinel fire, exhaust the Spartan batteries and could then be followed by the real attack with warheads.

This possibility forces us immediately to retreat from the doctrine of protecting the whole country. We then may choose to protect only cities and their suburbs. As soon as we do this, however, the Chinese could send over reentry vehicles with live warheads, directed to places some tens of miles west of cities. When these explode on the ground,

the prevailing winds would carry the radioactivity into the city, at least in many cases.

Balloons, of course, burn up or are slowed down upon entering the atmosphere, but as Dr. Ruina has pointed out, the Sentinel system does not rely on sorting by the atmosphere. It wants to have an area defense, and therefore the sorting of the incoming objects by the atmosphere is not available to the system.

DECOYS

The offense can make decoys more sophisticated than balloons. They may consist of a sturdy frame, and some wires carefully arranged to give the same radar cross section as the RV. This requires some skill, and the radar cross section must be carefully investigated. But this again can be done in the laboratory and does not need to wait for the Chinese ICBM capability. Decoys can again be made to weigh a few pounds and still to penetrate some distance into the atmosphere.

The ultimate decoy is not a decoy at all, but comes about when you supply the decoy with a warhead; that is, if you have multiple warheads. This method is the one which has been chosen by the United States and on which the Soviet Union now seems to be embarking.

CHAFF

A particularly effective means of penetrating ABM defenses is chaff. This consists of very thin metal wires cut to a length of about half a wavelength of the radar. But the exact length is not important, a chaff wire will also be effective against shorter wavelength radar. For instance, one may think of copper wire 1 mile in diameter: 100 million such wires, cut to work against UHF radar, will weigh only 400 pounds and therefore can be easily carried by an ICBM. This can easily be carried by the ICBM. The only problem is the dispersal of these chaff wires, and this is indeed a tricky one. But if a country learns to disperse chaff, it can make a cloud of chaff hundreds of miles long, spread along the trajectory of the ICBM. This chaff cloud will simply look black to the radar, and any RV or decoy can be concealed within it. If the defense wishes to hit the RV above the atmosphere, they must send a considerable number of antimissiles against the cloud.

ELECTRONIC COUNTERMEASURES

It is possible to design vehicles which emit radio waves of about the same frequency as the defense radar, which will then jam that radar. This is known as ECM, electronic countermeasures.

BLACKOUT

My favorite penetration aid is blackout. The ABM system involves the explosion of high-yield nuclear weapons at high altitude. Any such explosion ionizes the atmosphere—that is, it tears the electrons of the air atoms away from the rest of the atom. These electrons are powerful reflectors of radio waves.

Senator GORE. Doctor, may I interrupt to be sure I understand? Are you speaking now of an enemy exploding a bomb within the atmospheric path of missiles to follow? Are you speaking of an explosion as a decoy or as a blackout? I didn't quite get your meaning.

Dr. BETHE. I am speaking, and I was going to come to that, of both possibilities, an enemy intentional explosion in the path of an incoming ICBM—that is, they may send first one ICBM to explode at some high altitude, like 100 miles, and thus create blackout by this over a considerable area, and then they may send after this initial explosion another warhead which would then be concealed by the blackout made by this first explosion. But I am speaking also of explosions which are produced by our own defensive missiles. The Spartan missile has a nuclear warhead, and this warhead, when it explodes, will make blackout. Of course, the designer of the Spartan missile is seeing to it that this blackout be minimized, but it cannot be avoided, and a sufficient number of Spartan missiles exploding in what is called the battle zone will cause very substantial interference with the defensive radar and will make the task of this radar much more complicated.

Senator GORE. Thank you.

BLACKOUT CAUSED BY BATTERY OF MISSILES

Senator SYMINGTON. Mr. Chairman, I would ask a question there for clarification.

Dr. Bethe, as I understand what you are saying, if there was a battery of, say, 30 Spartan missiles, without the enemy even sending an offensive missile over to create a blackout, the first Spartan defensive missile could create a blackout which would nullify the efficacy of the next 29?

Dr. BETHE. Sir, I do not mean it quite that hard. That is, I mean that a Spartan missile would create some blackout. If you send up, let us say, 10 of these Spartan missiles and explode them more or less in the same vicinity, this would create a blackout which would nullify the remaining 20.

Senator SYMINGTON. Thank you, Mr. Chairman. Thank you, Doctor.

Dr. BETHE. In fact, the ionosphere, which is permanently around the earth and is responsible for radio propagation around the world, consists of just such electrons torn off from atoms by sunlight. An atomic explosion would produce a much higher concentration of electrons and would thus reflect radio waves of much higher frequency than the ionosphere. This gives radar blackout for a certain length of time after the explosion, usually counted in minutes, and this has been observed in our own high-altitude nuclear weapons tests in 1958 and 1962.

We know something about this blackout from the actual tests performed. A lot of additional information has been obtained by theoretical calculations since 1962. A megaton explosion at high altitude will cause blackout of UHF [ultra-high frequency] waves which are to be used in the PAR radar, for several minutes. This blackout will not cover the whole sky, but it may easily cover an area of 100 miles' diameter or more. There are two blackout regions, one arises from the "fireball"; that is, the air that was originally heated by the nuclear explosion. This usually rises to a high altitude, 100 miles or more above the explosion. The second is due to the beta rays emitted by the fission products which are left over from the explosion. This beta ray blackout is concentrated at altitudes from 30 to 40 miles. Blacking out a region of 100 miles' diameter covers a large part of the sky.

The enemy can further increase the effectiveness of blackout by sending his missiles on a trajectory which reenters the atmosphere at a low angle. This costs him some energy so it reduces the payload of his missiles, but it makes penetration of his missiles easier even in the absence of blackout.

CHINESE REACTION TO SENTINEL

Now, what are the Chinese likely to do about ICBM? Our intelligence predicted a Chinese ICBM test for late 1967. It obviously has been postponed at least a year and a half. When it will actually happen I cannot predict. Nor can I predict when they will be able to deploy an ICBM system. The estimates of the Defense Department seem to me quite reasonable.

If we deploy Sentinel, this may have various effects on the Chinese ICBM plans. They may give up ICBM altogether, but this is not very much like their normal behavior. They are looking for prestige, and ICBM certainly adds prestige.

They may build an ICBM in a straightforward manner without developing pen [penetration] aids. In this case Sentinel will be effective against a certain number of Chinese ICBMs, like the 75 mentioned by Dr. Fink earlier.

As a third alternative, they may develop pen aids at the same time as they develop the ICBM itself, and may be ready with pen aids very soon after the first deployment of ICBM.

It seems to me entirely logical for them to do so. Moreover their history in atomic weapons development makes exactly such a course likely. You will remember that they tested their first H-bomb only 2 years after their first A-bomb. I interpret this as meaning that they must have done a lot of theoretical work on the H-bomb before their first A-bomb was ever exploded. You can do a lot of theoretical work and laboratory work before you have the industrial capacity to put the hardware into the field. In the last 20 years, we have gone mostly the other way, testing hardware very quickly, but during the war, at Los Alamos, we were forced to use the method which I think the Chinese have used, namely, to do theoretical and laboratory work before hardware deployment. The Chinese are clearly weak industrially but they are not weak in brain power. It seems to me entirely credible that they would develop one or more systems of penetration aids in the laboratory and by tests using their existing medium range ballistic missiles before they have an ICBM operational capability.

In this case, Sentinel ability to stop a Chinese missile attack will only last for a short time after the first Chinese ICBM deployment. They need to deploy only a small number of ICBMs to penetrate our defenses. At least two studies of this problem have been made. One of these, which assumes the Chinese make a determined effort to develop penetration aids, concludes that they will be able to penetrate the Sentinel systems with a number of ICBMs much less than 75. I believe we must be prepared that this prediction may turn out to be correct.

CHINESE ATTACK WOULD BE SUICIDAL

It is for your committee to judge whether a few years of protection against the Chinese missile attack is worth the price of the Sentinel system. In forming that judgment, you will certainly take into account that any Chinese ICBM attack on this country in the foreseeable

future—and that includes all the 70's—would be totally suicidal without accomplishing much of military value against the United States. We have, and we shall continue to have, overwhelming strategic superiority over Communist China. China has not shown any suicidal tendencies in its military policy toward other nations. They may have suicidal tendencies in the conduct of their internal politics, but this is a different matter altogether.

Our great superiority over China is predicated upon the political separation of China from the Soviet Union. It is difficult to predict whether this separation will persist, and you are obviously more competent than I to judge the prospects for this. But I think you will agree that it is in the interests of the United States to do everyhing in our power to preserve this split in the Communist world. This is a diplomatic problem, not a military one. It does not seem to me that Sentinel is a useful instrument for this purpose.

RUSSIAN REACTION

I now will talk about the arms race and the Russian reaction.

If we accept the hypothesis that the Chinese will deploy their ICBM system in the most effective manner compatible with their limited resources, the question will arise what our reaction should be. If we deploy the Sentinel system we shall probably be tempted to improve it in quality—this is what Dr. Fink has talked about—and gradually to increase the number of our antimissiles so as to keep up with the developing Chinese threat. In fact, General Starbird, who is in charge of the Sentinel system, has testified to the House Armed Services Committee last spring that we shall indeed attempt to do so. I agree with General Starbird that we shall probably be successful and shall be able for a long time to keep the Sentinel system at about its initial capability of intercepting Chinese missiles. But this would probably cost quite a lot but it would certainly be within our financial capability.

However, in the course of this race, our ABM system would be built up to a point where it would appear threatening to the Soviet Union. We must remember that any prudent defense planner will tend to be conservative. When we race the Chinese, we will make a high estimate of the prospective number of their missiles and of their capability in penetration aids, and we shall therefore tend to deploy three to five times as many antimissiles as are actually needed. The Soviets in turn will overestimate our building plans for antimissiles as well as the capability of our antiballistic missile system. To preserve their assured destruction capability, they are then likely to build again three to five times as many ICBMs as Soviet buildup of 10 times that number. This in turn will cause us to respond in kind with an increase of our ICBM force.

In saying this I assume that the Russians do not feel threatened by the Sentinel plan as now conceived. Whether this is actually the case remains to be seen.

ABM TO DEFEND MINUTEMAN SILOS

A completely different concept of ABM is to deploy it around Minuteman silos, and at command and control centers. This application has gone in and out of Defense Department planning. I am in favor of such a scheme at the appropriate time.

My main reason for being in favor is that such a deployment would stabilize the strategic situation rather than the opposite. You are all familiar with the theory of the stable deterrent in which both the Soviet Union and the United States can absorb an initial attack by the other, and are still able to retaliate. Thereby the chance of such an initial attack is greatly diminished, certainly as long as neither party wishes to commit suicide. In this framework, and I do not know any reasonable alternative for this framework, it is vital to preserve our retaliatory capability. This is well assured at present. But if the multiple independent reentry vehicle can be aimed with very great accuracy, our land-based missiles may some time in the future be in jeopardy. For such an eventuality—and this is far in the future—ABM defending our Minuteman silos would be a very sensible countermove. It is not the only one possible, and all possible ones should be considered before deciding which is best.

I believe that the Sprint missile and the missile site radar are probably adequate components for the defense of our Minuteman silos and for our command and control centers. Perhaps the Department of Defense would want to modify them somewhat for this specific purpose. It is not clear to me that the rest of the Sentinel system is needed for this type of ABM deployment. Absence of the rest of the system and deployment of ABM only around our strategic forces would give the Russians better assurance that we are not seeking to deny them their second strike capability.

This would be even clearer if the missiles and radars of the ABM defense of Minuteman were specifically designed in such a way that they could clearly not be used for city defense.

REASONS FOR OPPOSITION TO SENTINEL

I want to summarize my main argument. I am opposed to Sentinel because I do not believe it will be effective, and I do not believe it is necessary against Communist China.

Much more important I believe it will be a powerful stimulus to the arms race. This, I think, will be true in time if we merely try to improve Sentinel's effectiveness to keep pace with the developing Chinese threat.

It will be much more true if the ABM idea gains momentum and induces us at some later time to deploy an ABM system against Soviet Russia.

I agree most heartily with the statement of former Secretary of Defense McNamara that such a deployment would be "foolish and reckless."

The whole complex of problems has been discussed by Dr. George Rathjens, a former member of the Arms Control and Disarmament Agency, now professor of political science at MIT, in a pamphlet written for the Carnegie Endowment for International Peace, entitled "The Future of the Strategic Arms Race."

It shows we now stand at the crossroads and that both ABM and MIRV [multiple independent reentry vehicle] threaten the strategic equilibrium.

He argues, and I agree with him, that ABM is far easier to control by an arms limitation agreement than MIRV.

Indeed, an arms control agreement, to which your subcommittee is dedicated, is our one best hope to prevent the arms race from being resumed, and our best hope to improve the security of the United States. Prohibition or severe restriction of ABM, including the Sentinel system, must be part of this. Once we and the Soviet Union have deployed ABM systems, it will be far more difficult to eliminate them. This, in my opinion, is the 11th hour for arms control. And it is urgent that negotiations on this be started promptly and not with delay.

If we permit the Sentinel system to be deployed and then to grow, it may become more and more difficult for your subcommittee to achieve its constructive purposes.

Senator GORE. Thank you, Dr. Bethe.

I would like to read one statement which Dr. Ruina made and then ask the other distinguished panelists to respond or comment upon it.

DEPLOYING SENTINEL TO PROTECT POPULATION

With respect to the deployment of the Sentinel system, Dr. Ruina says, "I believe that there is universal agreement that deploying it to protect our population against a possible Soviet attack makes no sense at all."

Now, Dr. Fink, would you mind responding to that first?

Dr. FINK. If I take what Dr. Ruina wrote literally, deploying Sentinel against—to protect our entire population against the Soviet attack I would agree completely. First of all Sentinel would be totally ineffective for that purpose. I wonder whether Dr. Ruina really meant more than that. No?

Dr. RUINA. Just that.

Dr. FINK. The answer is "Yes, I do agree with it."

Senator GORE. Dr. Bethe?

Dr. BETHE. I would like to amplify it the way that I did. In my opinion the deployment of any system against the Soviet Union makes no sense at all because at a much smaller cost than the cost of our defensive system the Soviet Union would be able to increase their offensive force in such a way as to counter our conceivable defensive force.

This is all contained in the statement of former Defense Secretary McNamara, to the Congress, in support of the armed services budget for fiscal years, I think, 1968 and 1969. He estimated that if we wished to keep American casualties to 40 million people—and this, I think, everybody will agree is a terrible prospect—if we wish to keep them to 40 million casualties, and this is prompt casualties in the immediate attack, not counting the casualties later made by the disruption of our industrial and transportation system, then the Soviets can counter any foreseeable ABM system by spending one quarter of the amount of money which we would spend on our system.

Senator GORE. I guess all of us who know so little about this have attempted to oversimplify it. But it does seem to me if we are considering the security of the American people, and the question of deploying, we should consider first, whether the Sentinel system is capable of protecting the people. You three have now agreed that it is not.

PROTECTION AGAINST CHINESE ATTACK

Now, the next question which I would like each of you to comment upon is whether it would protect our people against a possible Chinese attack. Who would wish to respond to that?

Dr. RUINA. I think you must say that it might, it probably will offer some degree of protection against the Chinese attack.

This is a complicated system, it has been tested extensively, not perhaps as extensively as one would like to see any system that is deployed tested, but nevertheless one can have some assurance it will have some degree of protection against Chinese attack. The question that has been raised, at times, is whether with Sentinel we can assume that the Chinese don't have any missiles when they really do. We say those missiles do not mean a thing because we have Sentinel, and I cannot see where under any circumstances we can make that assumption. We can assume that Sentinel will give us some degree of protection but not complete protection.

Dr. BETHE. I would quite agree with that. It will give some degree of protection in that, as Dr. Ruina stated previously, maybe if they have 40 missiles, only five of them will penetrate. But would we risk the penetration of five missiles, and, conversely, would the Chinese send off their missiles against us knowing that it would mean complete destruction of their country? I cannot believe that the Chinese would want to commit suicide in this manner.

Senator GORE. Dr. Fink?

Dr. FINK. My personal view is that Sentinel should be effective for some period of time against the Chinese. As Dr. Bethe indicated, there are techniques of penetrating. These are obviously things that the DOD has been working on for many, many years, our own R. and D. program, so we have a fair amount of knowledge on them. They are not easy. Each of these techniques, whether it be balloons, chaff, or what have you, are difficult to engineer and deploy. But ultimately the Chinese can do it.

The question is really how much time can you protect from the Chinese to a fairly high level—that is, as Dr. Ruina says, he picked five out of a hat in terms of how many missiles might get through. It would be impossible for me or anybody to say the defense would be perfect. Five is not a bad number.

Regarding our desire to have it, and whether we can depend upon our deterrent solely against the Chinese, of course, is a matter strictly of judgment. I feel that even if it is almost true the insurance might be worth it.

NO PROTECTION AGAINST SOVIET ATTACK

Senator GORE. Let us concentrate on the possibility of providing protection for the American people. I think there seems to be an agreement here. There is an agreement among you that it would provide no protection against a massive Soviet attack.

Dr. FINK. Yes.

Senator GORE. Do I correctly understand you are in agreement that it would provide partial defense against a limited Chinese attack if they had missiles and should make such an attack?

Dr. RUINA. For only an interim period. I think this period might be for 10 years or might be for 12, and it might only be for 5 years. I do not think anyone claims this might be true indefinitely.

Senator GORE. This leaves me with the question, Can you imagine any country making a limited nuclear attack on the United States? Unless they have enough to knock us out, would they risk sending over a few trial hits and risk our retaliation?

DEFENSE AGAINST OTHER METHODS OF PENETRATION

This gets into a technical field.

Let me go to a technical field, concentrating on the protection of the American people. Now, one of you said there were other systems, there were other methods of penetration. One of you mentioned the submarine.

Dr. Fink, would you respond to that? You did not refer to this in your statement, I do not believe.

Dr. FINK. There is no question that there are other avenues for any country to attack other than ICBMs. There are bombers, submarines, missiles on ships, and I think Dr. Ruina's point was if you were serious about defending against the Chinese, you had better have a balanced defense, and I do agree with that.

So therefore, air defenses would be important, and I believe really the posture that the country is trying to achieve in air defenses would probably be adequate against the Chinese.

You could also, of course, eventually start to think of suitcase bombs and the like. I personally think there is a real difference between that kind of an attack and something which is a true military capability, something like an ICBM or a bomber.

Senator GORE. The matter under consideration now, as I understand it, is the deployment of the Sentinel system. Now, what protection, if any, would it provide against atomic missiles delivered by planes or fired from submarines?

Dr. FINK. There might be some limited capability against bomber-delivered weapons, although that is not really its primary purpose. Against submarines the requirement is to have radar faces which face the sea, and the original Sentinel deployment did not have such faces. In that sense they could not protect the United States against attack from the sea.

Senator GORE. Would you other gentlemen agree with that?

Dr. RUINA. Yes.

Senator GORE. Where is the protection for the American people in the Sentinel system then?

SENTINEL DEFENSE AGAINST SHORT-RANGE SUBMARINE LAUNCHED MISSILES

Dr. BETHE. May I ask a question of Dr. Fink?

Senator GORE. Yes.

Dr. BETHE. How about the short-range submarine-launched missiles? Would Sentinel offer any protection against them, seeing that it is essentially a long-range system relying on atmospheric intercepts?

Dr. FINK. If the range gets short enough, Dr. Bethe, of course these

footprints shrink and so you do not get total area coverage, so I am afraid we would have to depend somewhat on the U.S. Navy to keep the submarines offshore.

Let me try to answer the question, Mr. Chairman, about Sentinel. It was designed against just the ICBM. That is all it was designed against. Now, if the judgment were made that submarines would be the route the Chinese would go as opposed to ICBMs, there would not be much of a change to Sentinel to provide radar faces facing the coast so we could get some protection against attacks from the sea.

Senator GORE. The Soviets, of course, have a vast submarine fleet. But as of now the Sentinel as presently designed if deployed would provide no protection at all against Soviet submarine attack.

Dr. FINK. I believe that is correct.

Senator GORE. I yield now to the Chairman of the committee.

Senator FULBRIGHT. Are you saying our officials seriously intended to have a defense against China, or was this the most appealing justification in public relations terms at the time?

Dr. FINK. I have heard the system called many times the anti-Republican system as opposed to the anti-Chinese system. All I can say for those of us, let me call the working level at the DOD, we were making an honest attempt to design a system against the Chinese, literally.

Senator FULBRIGHT. Who asked you to do this, the Secretary?

Dr. FINK. The Secretary.

CONCERN ABOUT CHINESE ATTACK QUESTIONED

Senator FULBRIGHT. And did he really say he was concerned about a Chinese attack on this country?

Dr. FINK. Yes.

Senator FULBRIGHT. And how were they going to follow it up without a navy or air force? Why were they going to do it, just because they do not like us? This all seems rather silly. Were you ever asked to put up a defense against an Andorran attack? [Laughter.] Or take Albania, Albania says mean things about us. Do you think we have any defense against Albania? If not, why not? Why do we not have one against everybody?

Doctor, as Dr. Bethe said, what reasonable ground is there to anticipate an attack from China, given her lack of a capable navy or air force? What would they follow it up with? It makes no sense at all. And it makes me believe it was never intended as a defense against China. That was just an excuse to get a foot in the door to build one against Russia. It just is not being honest with the public or with the Senate or the Congress. That is what I object to.

SENTINEL WITHIN OUR FINANCIAL CAPABILITY QUESTIONED

Dr. Bethe, this whole discussion seems to me to take place in isolation from any other problems that this country has. You are not the only one when you say: "This would probably be costly but would certainly be within our financial capability." What do you mean it is within our financial capability when you are aware of demands in many other very critical areas of this country's responsibilities? You said earlier that the Chinese have not shown any suicidal tendencies in

a military policy, but they may have in internal politics. Well, if we do not do something about our internal politics, we are going to commit suicide. If we are going to divert all this money for Sentinel, how are we going to manage it?

I do not quite know what you mean when you say it is certainly within our financial capability. I do not believe it is.

Dr. BETHE. Well, Senator, I certainly agree with you wholeheartedly that one should not consider this problem in isolation and separate from other problems, and I would agree with you wholeheartedly that there are many other problems of the United States, and in particular our internal problems which, to me, have much greater urgency. But if the Nation were to determine that the keeping up of the Sentinel system to keep pace with the Chinese was a matter of high priority, it would be possible to do so.

Senator FULBRIGHT. But I do not like to hear a man of your standing say it is certainly within our capability, because that is a big "if" you put there. You cannot determine that, regardless of priorities, can you?

Dr. BETHE. I am very happy to stand corrected. [Laughter.]

Senator FULBRIGHT. I bring this up because this one sentence will be picked out of context, and a news report will say Dr. Bethe says we can easily afford the Sentinel. That sentence will stand alone. I do not believe you mean it in this sense, because we really do have to look at all of our needs, do we not?

Dr. BETHE. I certainly do think that we have many more important things to do, even in the area of defense.

Senator FULBRIGHT. Even in defense. I remember Secretary McNamara was given to one idea of saying that we could afford anything we want to. We could afford all we needed for education, for health, welfare, the cities, and also the biggest and best armaments in the world. It just did not make any sense to me then, and is not now.

I think we are in very serious trouble because of that idea. We have to judge the Sentinel project and other defense projects in relation to other needs and necessities. Because what good is this defense if we are going to blow up internally. Maybe I am a little more conscious of this than you are. For the first time yesterday in New York a very unruly group attacked me because they were against the war in Vietnam. It is a rather odd reason, but nevertheless it happened in the greatest city of America. There is nothing peculiar about it; this goes on every day, but it is only a symptom of one of the things that is wrong with this country.

Dr. BETHE. Senator, I am quite aware of that. I live at a university, and the unrest at the universities is just about as big as anywhere at this point.

SENTINEL LOW ON LIST OF PRIORITIES

Senator FULBRIGHT. This is what bothers me when we get into this discussion. You know I and many others feel the Sentinel project is very costly and a matter of lowest priority in comparison with other needs of this country.

You said it is ineffective against Russia; you all agree with that position, I think. So why build it? I think it is a complete misrepre-

sentation if it ever was really presented as a defense against China because the probability of Chinese attack is so remote. It makes much more sense if it were designed as a defense against an attack from Albania.

Dr. BETHE. Yes.

ESTIMATED ULTIMATE COST OF THICK SYSTEM

Senator FULBRIGHT. The other day Senator Symington stated that it is quite possible this kind of a system would ultimately cost $400 billion. Did you see his statement?

Dr. BETHE. $400 billion?

Senator FULBRIGHT. Is that not right?

Dr. BETHE. It is quite a lot of money.

Senator FULBRIGHT. It could cost that. Is that not right?

Senator SYMINGTON. Mr. Chairman, as you bring this up, and with the Chair's indulgence, the testimony was not mine; rather from the Department of Defense. When they defended the cost of the C–5A airplane, which went up only some 25 percent, they pointed out that a published study gave an average increase for 12 weapons systems, picked at random, of 220 percent. On that basis, if the thick system was estimated originally at $50 billion, that would mean the cost of the system would be $160 billion if it followed the average increase. Then they advanced a study, the most recent study by the Brookings Institution, which said that their analysis of weapons systems increase showed an increase of from 300 to 700 percent. I later said that if you took the top figure, 700-percent increase that would total $400 billion for the thick ABM.

Senator FULBRIGHT. Thank you, Senator Symington.

EFFECTIVENESS OF RUSSIAN GALOSH SYSTEM

Do you think the Russian system, the Galosh system, is effective so far as you know?

Dr. BETHE. I would imagine that the Russian system would bring down a few of our ICBMs if we sent them against Moscow. How many, I do not know. I would not call that effective because we have so many ICBMs that it does not seem to me it makes much difference if a few of these are intercepted.

Senator FULBRIGHT. Dr. Fink, would you comment on that same question? Do you believe that the Russian system is an effective system and gives them protection upon which they could rely?

Dr. FINK. You have to define the word "effective" a little bit. It could shoot down some missiles, but as I understand the system, it only has like a hundred launchers. So even if it was a hundred percent effective, all it could do is shoot down a hundred missiles, and the rest of our 1,600 would get through. So in that sense, of course, in terms of protecting their population, no, it is not effective. In terms of shooting down missiles and perhaps causing us to take some actions to penetrate it, it could be effective.

Senator FULBRIGHT. If we send over multiple warhead missiles, it would not be very effective, would it?

Dr. FINK. No. For every one we send over, they have to shoot that many Galoshes at us.

Senator FULBRIGHT. If it is not effective, there is no real justification for our going all out for a similar system, is there?

Dr. FINK. Not from the standpoint of protecting lives; no, I do not believe that it is.

Senator FULBRIGHT. From what point of view, then, just to amuse the Sentinel itself, as it's fired?

Dr. FINK. I tried to make that one point at the end of my statement. The Russian system, while it is around Moscow, would appear to be an area defense system also, so it covers a rather large fraction of western Russia.

As a deterrent, it has no impact on us at all. If we want to use our force for any military purpose, not just killing people, but shooting at airbases and control and command centers, it then complicates such an attack considerably. This is the one thing, the one positive thing, that I can say about a light system vis-a-vis the Soviet Union, not as a people saver but as a means essentially of dissuading military attack.

BALANCING NEEDS OF COUNTRY

Senator FULBRIGHT. One last question. I do not want to take all the time.

Dr. Fink, in the discussions of policy and decision making at the highest level, is the attitude of the Pentagon leaders that they have no responsibility at all for any area other than military affairs? Have you ever heard them attempt to balance the needs in this area with any other need of this Nation or do they feel that their mission is confined solely to military affairs?

Dr. FINK. I could not possibly speak for other members of the Department of Defense. I think all of us who were in it were pretty conscious of the amount of money going into the defense program and did our best to do things in the most—to coin a wornout phrase—cost-effective way.

INEFFECTIVENESS OF CERTAIN WEAPONS SYSTEMS

Senator FULBRIGHT. Are you familiar with a recent article by Mr. Nossiter in the Washington Post in which he points out that some 14 weapons systems costing $40 billion proved to be false starts; they were ineffective?

Dr. FINK. No.

Senator FULBRIGHT. You are not familiar with the article?

Dr. FINK. I am not familiar with the article; no, sir. One of the tragedies of leaving Washington is I do not get the good newspapers any more.

Senator FULBRIGHT. Oh, I thought maybe the people in the Pentagon had drawn it to your attention.

He did say this conclusion was based upon a study by a man who had been in the Budget Bureau, and so far as I know it has not been directly—well, I do not know that it has—attacked or discredited or even attempted to be discredited by the Pentagon. It was a rather shocking statement that they could engage in this kind of activity which seems to a great extent to be useless, that the systems were ineffective.

Senator Symington knows much more about this than I do. I yield, Mr. Chairman.

(The article referred to follows: Senator Fulbright's remarks and the study appear on page 453 of the appendix.)

[From the Washington (D.C.) Post, Jan. 26, 1969]

WEAPONS SYSTEMS: A STORY OF FAILURE

(By Bernard D. Nossiter)

The complex electronic gadgetry at the heart of new warplanes and missiles generally works only a fraction of the time that its builders had promised.

The performance of the multi-billion-dollar weapons systems started in the 1950s was bad; those of the 1960s are worse.

The Pentagon appears to be giving the highest profits to the poorer performers in the aerospace industry.

These are the conclusions of an abstruse 41-page paper now circulating in Government and academic circles. The document, a copy of which has been made available to The Washington Post, is believed to be the first systematic effort to measure how well or ill the Pentagon's expensive weapons perform.

Its author is a key Government official with access to secret data and responsibility for examining the costs of the Pentagon's complex ventures. He and his agency cannot be identified here.

His paper, entitled "Improving the Acquisition Process for High Risk Military Electronics Systems," aims at bringing down the costs and bettering the dismal performance of weapons. It does not discuss a question that might occur to others; if these weapons behave so badly, why is the money being spent at all?

For security reasons, many of the planes and missiles examined are not identified by name.

The paper first examined 13 major aircraft and missile programs, all with "sophisticated" electronic systems, built for the Air Force and the Navy beginning in 1955, at a cost of $40 billion.

Of the 13, only four, costing $5 billion, could be relied upon to perform at more than 75 per cent of their specifications. Five others, costing $13 billion, were rated at "poor" performers, breaking down 25 percent more often than promised or worse. Two more systems, costing $10 billion, were dropped within three years because of "low reliability." The last two, the B–70 bomber and the Skybolt missile, worked so badly they were canceled outright after an outlay of $2 billion.

LOSES FURTHER LUSTER

The paper sums up: "Less than 40 per cent of the effort produced systems with acceptable electronic performance—an uninspiring record that loses further luster when cost overruns and schedule delays are also evaluated."

The paper measures "reliability" in this context: The electronic core of a modern plane or missile consists essentially of three devices. One is a computer that is supposed to improve the navigation and automatically control the fire of the vehicle's weapons and explosives. Another is a radar that spots enemy planes and targets. The third is a gyroscope that keeps the plane or missile on a steady course.

When the Pentagon buys a new gadget, its contract with the aerospace company calls for a specified "mean time between failure of the electronic system." In lay language, this is the average number of continuous hours that the systems will work.

In a hypothetical contract for a new jet bomber, Universal Avionics will sell the Air Force on its new device by promising that the three crucial electronic elements will operate continuously for at least 50 hours without a breakdown. In the reliability measures used in the paper described here, the plane is said to meet 100 per cent of the performance standards, if, in fact, its gadgetry did run 50 consecutive hours. However, if a key element breaks down every twelve and a half hours, it get a rating of 25 per cent; every 25 hours, 50 percent and so on. Should a system operate with a breakdown interval of 62.5 hours—a phenomenon that happens rarely—its reliability is rated at 125 per cent.

TEST FOR THE PILOT

Quite obviously, the more frequent the breakdown, the more the pilot of a plane has to rely on his wit and imagination to navigate, find targets and fly a steady course. Over-frequent breakdowns in a missile can render it worthless as an instrument of destruction.

Curiously enough, as the paper demonstrates, the Pentagon and the aerospace industry apparently learned little systems of the 1960's are even worse.

The document first looks at the performance record of the electronic systems in 12 important programs begun in the 1950's. As the accompanying chart shows, all but four missiles can be identified by name without breaching security.

Of the 12, only five perform up to standard or better; one breaks down 25 per cent more frequently than promised; four fail twice as often and two break down four times as frequently as the specifications allow.

The document discusses some of the good and bad performers in this group. It observes that the F–102, the Delta wing interceptor for the Air Defense Command, was bedevilled by an unsatisfactory fire control system. Its first had to be replaced; the next was also unsatisfactory, and an extensive, two-year program to modify the device was then undertaken.

SIDEWINDER DID WELL

In contrast, the Sidewinder, a heat sensing missile, performed very well. The study attributes this to the fact that the missile was developed in a leisurely fashion, without a "crash" schedule, and that several contractors were brought in to compete for key components.

The paper next examines eleven principal systems of the 1960s. These cannot be identified beyond a letter designation.

Thus, in the chart (not printed here) A1 is the first version of a plane or missile; A2 is the second version, possibly one for a sister service; A3 is the third version and so on. B1 is the first version of an entirely different system; so are C1, D1 and E1.

To make the best possible case for the Pentagon and its contractors, this survey does not include two systems costing $2 billion that performed so badly they were killed off. The eleven systems of the 1960s evaluated here account for more than half of those begun in the most recent decade and their electronic hearts cost well in excess of $100 million each.

Of the eleven systems, only two perform to standard. One breaks down 25 per cent more rapidly than promised; two break down twice as fast and six, four times as fast.

As a group, the eleven average a breakdown more than twice as fast as the specifications demand. Oddly enough, the first version of the system designated as "A" met the standard. But the same unidentified contractor produced three succeeding versions that fail on the average more than three times as often as they should. All these successors, the paper observes, were ordered on a "pressure cooker" basis, on crash schedules.

HIGHEST REWARDS

The paper also examines the relationship between contractors' profits and performance, and suggests that, contrary to what might be expected, some of the most inefficient firms doing business with the Pentagon earn the highest rewards.

The second chart looks at profits, after-tax returns as a percentage of investment, the only valid basis for determining profitability, for the ten years from 1957 through 1966. During the decade, the aeroscape firms managed to earn consistently more than American industry as a whole, piling up nine dollars (or billions of dollars) in profits for every eight garnered by companies not doing business with the Pentagon.

Even more peculiar is the brilliant earnings record of two of the biggest contractors, North American and General Dynamics. Both, except for a brief period when General Dynamics tried its hand at some civilian business, made profits far above the industrial average and generally in excess of their colleagues in aerospace.

During the ten years, North American did all but two per cent of its business with the Government. The study reports that it produced one highly successful plant in the mid-50s, another system that met performance specifications, one that

was canceled and four that broke down four times as frequently as promised. Nevertheless, the company's profits were 40 per cent above those of the aerospace industry and 50 per cent above the average for all industries.

NONE MEASURES UP

General Dynamics had, as the chart shows, a much more uneven profits record. But its years of disaster and even losses were those when it ventured into the economically colder climate of the civilian world to produce a commercial jet airliner. Having learned its lesson, it retreated to the warmer regions of defense procurement and, in recent years, has netted more than the industry average. It has compiled this happy earnings score, the study observes, despite the fact that none of the seven weapons systems it built for the Pentagon "measured up to expectations." Its most notorious failure is the F–111 swing-wing fighter-bomber.

As a final touch, the study notes that complex electronic sytems typically cost 200 to 300 per cent more than the Pentagon expects and generally are turned out two years later than promised. But both of these phenomena have been examined so frequently by specialists in the field that the paper does not dwell on them.

HOW MUCH PROTECTION?

These findings raise some serious questions. Perhaps the most important is how much protection the United States is getting for the tens of billions of dollars invested in expensive weaponry. Another is whether the whole process should be turned off and improvements made in the existing devices. Secretaries of Defense have repeatedly assured the Nation that present weaponry guarantees the destruction of any Nation that attacks the United States.

The document under study here, however, takes a different line, one aimed at getting less costly weapons that measure up to the promised performance.

It blames the dismal record on several factors. One is the relentless search for newer and more complicated electronic "systems." The aerospace contractor has an obvious vested interest in promoting "breakthrough" gadgetry. This is the way he gets new, and clearly profitable business.

CLOSE CORRELATION SHOWN

But the study asks, do the services need it? Since the Air Force and the Navy almost always accept a plane or a missile that performs at a fraction of its promised standard, it would appear from an exclusively military standpoint that a device of a much lower order of performance fits the Nation's defense needs.

The document also shows a close correlation between "crash" programs and poor performance. Thus, it proposes more realistic schedules. If a weapon is wanted in short order, five years or less, the study recommends that its electronic gadgetry be limited to familiar items.

If the Pentagon wants something that makes a "technical breakthrough," it should allow a minimum development period of five to seven years, it is pointed out.

Another factor in poor performance, the study says, is the absence of competition for new systems after the initial designs are accepted. Typically, the Pentagon requires five or so aerospace firms to bid on its original proposal. But typically, it selects one winner on the basis of blueprint papers. The study says that the military could save more money and get a better product if it financed two competitors to build prototypes after the design stage. Such a technique was followed, it recalls, with the F–4, a supersonic Navy interceptor. Even though the F–4 employed both a new radar and a new computer, it performed up to the promised standard.

At first glance, such a technique might seem like throwing good money after dubious dollars. But the study contends that if two aerospace competitors are forced to build and fly prototypes before they win the big prize—the contract to produce a series of planes or missiles—they will be under a genuine incentive to be efficient, hold costs down and make things that work.

NIKE-ZEUS SYSTEM

Senator GORE. The Chair would like to read a statement by former Secretary of Defense Clark Clifford submitted to the Congress in January of this year in connection with the budget. This is about the Galosh system around Moscow.

"Their Galosh system resembles in certain important respects the Nike-Zeus system which we abandoned years ago because of its limited effectiveness."

Would you gentlemen agree with the accuracy of that statement by the Secretary?

Dr. RUINA. Yes, sir.

Dr. BETHE. Yes.

Dr. FINK. Yes.

Senator SYMINGTON. Would the Chairman yield there?

Is it not true that on the 23d of January 1967, Secretary McNamara stated that if we had gone ahead in 1959 with the Nike-Zeus system we would have had to tear up and scrap $13 to $14 billion of what had been put in? Does anybody happen to remember? I think that is correct. Is it correct?

Dr. FINK. To the best of my recollection.

Senator SYMINGTON. Thank you.

Senator GORE. The Chair does not wish to take more time, but we have dealt with the problem of protecting the population. There is one other very important aspect which I hope some of my colleagues will bring out in their questions, and that is the capability of Sentinel defending our own missile sites. I would hope that it is brought out by some of my colleagues. I will return to that later.

Senator Cooper?

Senator COOPER. Thank you, Mr. Chairman.

As we have all said, we are most appreciative of your statements and discussions.

INTERNATIONAL PSYCHOLOGICAL EFFECTS OF SENTINEL SYSTEM

I wish to first question you about the international psychological effects of this system. I do so only to follow up the points that you yourself have made. The commencement of an ABM system of any kind is followed by counteraction by the Chinese for example and would then lead to a thicker system and, I believe you said, finally might lead to a reaction from Russia itself to increase its offensive missiles; is that correct?

Dr. BETHE. That is what I said.

Senator COOPER. I believe you will all agree, as has been brought out by Senator Fulbright, that you do not consider the Sentinel system as an effective system to defend against the Soviet Union.

Dr. BETHE. Yes.

Senator COOPER. I believe I understand from the course of your discussion that commencement of this thin system even as related to China, that as China improved its penetration aids, the United States then would have to thicken its ABM system; is that correct?

Dr. BETHE. That is what I said and what I foresee.

Senator COOPER. Then in proceeding with that you have suggested, as the thickening continues, at some point if it had not caused the Soviets to react before, it would then either begin and intensify their own defensive system or they would increase their offensive capabilities; is that correct?

Dr. BETHE. Yes, or both.

Senator COOPER. Would you agree to that, too, Dr. Fink?

Dr. FINK. Not completely, Senator.

Senator COOPER. Sir?

Dr. FINK. Not completely.

Senator COOPER. Will you tell me the distinction?

Dr. FINK. Well, I take a somewhat different view. I believe that we are all in agreement that thickening the system simply makes no sense. So once I make that statement, I find that it is difficult to believe a Soviet reaction which involves buying more force which we must react against.

Senator COOPER. I do remember that you said you did not think that it would be necessary to thicken the system even against the Chinese, I believe. Therefore there would be no counterreaction from the Soviet Union.

But to continue this so-called protection against the Chinese, if the United States continued to thicken the system, I believe the other two witnesses have said at some point they believe it would cause a reaction by the Russians and they would increase their offensive capabilities and also their penetration aids; is that correct? Do you all agree on that?

Dr. BETHE. I would imagine that their first reaction would be to increase their penetration aids. But I have seen on past occasions a lot of overreaction on our side. I imagine that our Russian counterparts act very much the same way as we do.

When we see some missiles, some antimissiles, going up in Russia or even just research and development, we develop penetration aids, and I think we were right in doing so. But when we see a defensive system, it is very difficult for us to estimate its exact capabilities, and there will always be lingering doubts whether our penetration aids are sufficient. Probably they are, but let us be sure and put in some more missiles of our own.

I think this is a natural reaction which our Defense Department would be inclined to take and which probably the Congress of the United States would go along with in such a case.

COUNTERREACTION FROM THE SOVIET UNION

Senator COOPER. That was the point I hoped to bring out, that once, it seems to me, we start on this deployment, that it begins an irreversible course of action, and that we gradually increase its thickness, and there would be a counterreaction from the Soviet Union as well as from China.

At this point I would like to have printed in the record comments of both Senator Russell in the hearings last year on the ABM system and Senator Stennis. I think I should read them so there will be no question about it. Senator Russell—and this is page 868 of the Senate hearings before the Committee on Appropriations, Defense Appropriations, part II, page 868—Senator Russell:

"I don't think there is any question but what they will proceed to develop one"—Senator Russell was talking about China—"It is inconceivable to me they would fire the first ones they had against this country and know they would be destroyed if they did so. I am glad we are going ahead, you understand, but I don't like people to think that I am being kidded by their talk of defense against the Chinese nuclear threat, because I don't think the Chinese are likely to attack us with an intercontinental ballistic missile at any time in the near future."

Then, Senator Stennis, on page 612 of part II of the Senate hearings before the Committee on Appropriations, in a colloquy with General Johnson said:

"It is my understanding that the Joint Chiefs of Staff still recommend the development of an ABM system to protect against Soviet missile attack, is this correct?

"General JOHNSON. Yes. In addressing the actions on force levels for the—deleted—JCS have stated that none is more necessary for the defense of the United States than the deployment of an effective ballistic missile defense against the Soviet Union."

Then later Senator Stennis said:

"It is my understanding that these elements of the Sentinel system will serve as a first increment to the deployment of a system to defend against a Soviet threat, is this correct?"

General JOHNSON. Yes. The Sentinel system approved for deployment is considered a worthwhile initial defense against the Soviet threat.

EFFECT OF ENEMY PENETRATION AIDS ON SENTINEL

Is it correct that you have agreed that the Sentinel system's effectiveness could be greatly complicated by penetration aids, such as decoys, that would be used by the Russians or even by the Chinese?

Dr. BETHE. I think there is absolutely no question that it is in the Russian capability to develop penetration aids, and effective penetration aids, against any system like the Sentinel system.

Senator COOPER. Now, on the question of blackout, the Soviets or the Chinese themselves could explode an incoming continental ballistic missile and create blackout; or an interception by a Spartan missile could also black it out; is that correct?

Dr. BETHE. That is correct. And, of course, the more effective blackout would be caused by enemy missiles which have lots of fissionable material, lots of uranium in them, and which are deliberately designed to make a maximum of blackout. Our Spartan is deliberately designed to make a minimum of blackout.

Senator COOPER. Would an explosion by the Sprint missile or an interception by a Sprint missile, cause a similar blackout?

Dr. BETHE. The Sprint missile has a very low yield. It is in the kiloton range, and it is also meant to explode at a relatively low altitude, and both of these factors together make the blackout minimal from the Sprint missile. It is essentially negligible.

Senator COOPER. Is there another factor that with knowledge, we are all agreed, with knowledge of the capabilities of the offensive system to employ decoys and to cause blackout, in order to make our system more effective it would then require that we would have to have more Spartans and more Sprints?

Dr. BETHE. I would think so.

Senator COOPER. If a great number of our Spartans or Sprints were fired at decoys then there would be less defense for the remainder of the offensive missile coming in; is that correct?

Dr. BETHE. That is exactly correct.

Senator COOPER. There is another factor, then, which would lead to the thickening of the system. In fact, to have a more effective system you would have to provide more intercepting missiles.

Dr. BETHE. Yes.
Senator COOPER. From time to time.
Dr. BETHE. Yes.

EFFECT OF ABM ON ASSURED DESTRUCTION CAPABILITY

Senator COOPER. I will be finished in just a moment. If someone does not discuss this, the question of protecting our own missile sites, I will come back to it, but perhaps Senator Symington would. I read your article, Dr. Fink, and I think it was published last year, October. You remember it?

Dr. FINK. Science and Technology magazine.

Senator COOPER. Yes. I hope if I misquote you you will correct me, but am I correct that in this article that you said that the deterrent role of our strategic offensive forces is one of, and it is in italic, assured destruction? Do you consider that all of the leaders of the United States and the Soviet Union or at least the United States, consider that the deterrent against an attack by either, a first attack is based upon the deterrent that you have described in the same way, I think, as the ability to destroy each other even though one is the victim of a first attack; is that correct?

Dr. FINK. Yes.

Dr. BETHE. Yes.

Senator COOPER. Would you consider that either country or both countries entering this field of assumed offensive missile system protection could in any way upset or cause an instability in this deterrent which thus far, at least, has saved us, and perhaps a great part of the world from destruction, annihilation, and for all practical purposes the loss of any kind of civilization as we know it?

Would the starting off on this uncertain system, which you all have said is not very effective, upset what has been a stable situation? If each country has the power now to destroy each other, and by this continuing development of offensive weapons maintain some kind of deterrent, do you believe the initiation of another kind of system, this so-called defensive system, would have any possibility of making less stable the deterrent?

Dr. BETHE. I very strongly believe so, that it would indeed make it much less stable.

I do not believe that any—I do not believe that a reduction of fatalities from 50 to 20 percent would eliminate deterrence, and if such a reduction were possible without paying a price for it, I would be for it. But I think we would pay a heavy price for it.

I believe that the introduction of the antiballistic missile would indeed destroy, or at least impair, the strategic balance and the assured destruction capability.

I believe strongly that it would cause an overreaction. If it were somewhat effective, it would cause an overreaction from the other side, and this goes both ways, and I believe another destabilizing factor is the MIRV.

I do not know how to deal with the MIRV because I do not know how to see a MIRV when the Soviets deploy one. I do know how to see them when they deploy ABM and, therefore, I agree with this

pamphlet by Dr. Rathjens which I very much recommend for your study, that the ABM is the point to attack, that ABM is the one place where it is most hopeful to avoid this new escalation.

But I am quite convinced that a new escalation would be caused by introducing any massive ABM into the picture.

Senator COOPER. Do you wish to add something, Dr. Ruina?

EFFECT OF SENTINEL ON STRATEGIC BALANCE

Dr. RUINA. I think to answer this question, we should distinguish between the thick anti-Russian system, the Nike X, which I think everybody at the table agrees, would provide a great element of instability, and the Sentinel system—which we should accept at face value as a thin anti-Chinese system. I do not think the Sentinel system would greatly disturb the balance, but it is an oversimplification to say that it would not disturb the balance at all.

The Soviet system around Moscow, which I read in the press may have something like 100 interceptors, was at least sufficient to cause some reaction in the United States, not a large one, but some. Our offensive forces are not going to be very much more costly, but we are not going to have any more security at this new level. The probable Soviet reaction to our new Sentinel, which has hundreds of interceptors, would be more costly to them, and would raise the level of equilibrium, but with no more security for either side.

But I think it would be an oversimplification to say it changes the balance. It just raises the level at which there is a balance, it is another step in the escalating arms race, but a small step.

Senator COOPER. Dr. Fink.

EFFECT OF LIGHT DEFENSE ON STRATEGIC STABILITY

Dr. FINK. I will swing a little further still. My view is that the kind of light defenses we are talking about, I honestly do not believe will force that kind of reaction from the Soviet Union and a counterreaction from us to cause an acceleration of the arms race.

I think you realize that we are all agreed with the inefficacy of a large system which could do that. I think we are the ones who raised this reaction point much more than the Soviet Union. They seem much more concerned with our offense than they do with defense. They look upon defense quite differently, apparently, than we do.

They continually say, you know, what is so terrible about it in saving lives. They seem to miss the point very often about the concern that Dr. Bethe expresses, but nevertheless they seem to look upon defense quite differently.

It is not obvious to me that they have an insatiable demand for some fixed number of American lives as a deterrent. If we are concerned about this we must be concerned about more than ABM. It is not just MIRV; accuracy, for example, is a threat to their deterrent. An ASW [anti-submarine warfare] breakthrough would be a threat to their submarine-based forces, and so forth, so there are many other threats that an offense has to be concerned with than ABM, and I just do not believe the light ABMs we are talking about are going to cause any instability.

EXTENT OF DANGER IN DEFERRING DEPLOYMENT

Senator COOPER. One other point and I will close. You have discussed, and I think very objectively and thoroughly, your views on this system, and we have talked about it in terms of offense and defense, and if we do not enter into talks on nuclear arms limitation, this race will go on forever.

I think the point that a great many now are trying to make is that at least it is not necessary to go on forever if someone will make an effort, either our country or their country, if both countries make an effort, to see if it can be stopped in some way.

Would you care—this is a very general question—but would you care to state your opinion on whether or not this country would be in danger, say, for a year or whatever period of time you would like to state, 6 months, 1 year, 2 years, to see if the United States can come into agreement with the Soviet Union, that during that time we would not go forward with the deployment of these systems.

I think almost everyone believes you cannot get agreement with the Soviets unless it is in their mutual interest, and this might be in their mutual interest. If this system were necessary to defend this country and its people, I would support it.

Do you think we would be in danger by trying for a year or so to see what we can do?

Dr. FINK. Do I go first this time? I would be hard pressed to say there would be any real danger by that kind of a delay.

I would just raise one question, though. It is not obvious to me that it is more difficult or less difficult to get an agreement with the Soviets on strategic forces if we do or do not start the ABM. I think there is an argument that they would be very uninterested in an agreement which prohibited ABM.

I think they would be much more likely to accept one which, at least, permitted some light ABM.

Dr. BETHE. I can agree with this. I certainly do not see any danger to the security of the United States in postponing the system.

I do not know what influence it would have on the arms control negotiation with the Soviet Union.

Some people have argued it is better for these negotiations if we intend to deploy an ABM. Some have argued it is very bad for us to do so. I am quite neutral on this, and I think the one point I would insist on is that an agreement with the Soviet Union to satisfy me would have to contain a prohibition of any heavy ABM.

Dr. RUINA. I certainly agree postponing Sentinel for a year would not cause us any harm or any danger and for myself I would even say I would like to see postponement for longer than a year. Eventually, the system will be obsolete. Technology will catch up with it. Eventually, we will learn more about what the Chinese are doing and address what they are doing rather than the projections of what they may do.

So I would be completely relaxed about postponement for a year.

SOVIET REACTION TO SENTINEL

If I may have an opportunity while having the microphone, to talk about the Soviet reaction to Sentinel. In the action-reaction phenomenon which has been described by Dr. Rathjens, some people feel there

is a strong coupling, and others feel there is a weak coupling between the action and the reaction. I think you have to remember that there is a ratchet in the system which allows the drive mechanism to go only one way. When you have an action like Sentinel deployment, maybe the most logical Soviet response is to build penetration aids and nothing else.

But perhaps somewhere in the course of a 3- or 4-year period the reaction might be somewhat different, and they may deploy more missiles. I have not seen a time when either side has taken away missiles because they have overreacted—it is a one-way operation. You cannot assume that the reaction will be based on the most reasonable calculation on the other side; it will probably be based on that calculation over a period of time which will give the strongest reaction.

Senator GORE. Senator Symington.

OBSOLESCENCE OF WEAPONS SYSTEMS

Senator SYMINGTON. Mr. Chairman, I hope to be brief. To be sure we understand each other, gentlemen, regardless of cost, if I thought any system right and necessary for the defense of the country, I would be for it.

I do not think this Sentinel system in its present form will work effectively. The idea of it being adequately enough on alert, on a Sunday afternoon, to the point where it could catch a mistake firing from another country, to me is a modern technological expression of another Pearl Harbor.

Because I do not think it will work effectively, the cost becomes very important because, in my opinion, if we do not adopt more discrimination in choosing these many weapons systems we are going to bankrupt the country—and that won't help anybody.

I mentioned the quotation from Secretary McNamara in January 1967; and would like to now quote from Dr. John Foster, February 1967, in hearings incident to disarmament problems. He stated:

"I am concerned that with a very heavy system we would be in the following kind of position: Because of the enormous quantities involved, quantities of equipment involved, and the very rapid rate at which the technology changes to maintain an effective system, one would essentially have to turn over the whole system, the whole $20 billion system, every few years. I do not believe we would do this. As a consequence, I am afraid we would have a heavy deployment of a system most of which was obsolete, made obsolete, by changes in the enemy's offense."

I would point out, if I may, Mr. Chairman, that already we have gone from $20 to $50 billion, quite comparable to what was done with the thin system, because in 1967 Secretary Vance testified a thin system would cost $3½ billion. In 1968 that figure was raised to $5½ billion. Now I understand it is $9½ billion; so we are moving ahead.

ARTICLES FROM NEW-BEDFORD STANDARD-TIMES

Without asking for comment now, I would submit for the record, Mr. Chairman, because of the lateness of the hour, a sentence from one of the articles put into the record by Senator Kennedy, written by Mr. Everett S. Allen, assistant to the editor of the New Bedford Standard-Times. These 12 articles, to me, are the most informative

articles for a layman to read; for one who wants to find out what this ABM is all about.

In one of the articles Mr. Allen has two sentences. If the Chair approves, I would ask that each of these distinguished witnesses supply an answer for the record to the assertions made in these sentences.

Senator GORE. Without objection so ordered.

(See page 431 of appendix for text of articles referred to.)

Senator SYMINGTON. The sentences are:

"The system will be no good against a fractional orbital ballistic system, or a southern orbital system, or a multiple independent reentry vehicle system, or a group of multiple independent reentry rockets, or against a submarine close-range missile. It is 'fully expected' that by 1975, the Communist Chinese will have a diesel submarine ballistic missile capability against which the ABM would be ineffective."

(The comments referred to follow:)

GENERAL ELECTRIC CO.,
MISSILE AND SPACE DIVISION,
VALLEY FORGE SPACE TECHNOLOGY CENTER,
Philadelphia, Pa., March 12, 1969.

Mr. WILLIAM B. BADER,
U.S. Senate, Committee on Foreign Relations,
Washington, D.C.

DEAR MR. BADER: Per the request of Senator Symington last Thursday, March 6, during the Senate Foreign Relations Committee hearing concerning the Sentinel Program, you will find below my comments for the record on the following excerpt from a series of articles, "The Case Against ABM" written by Everett S. Allen and entered into the Congressional Record of the Senate by Senator E. Kennedy.

"The system will be no good against a fractional orbital ballistic system, or a southern orbital ballistic system, or a multiple independent reentry vehicle system, or a group of multiple independent vehicles, or against a submarine close-range missile. It is 'fully expected' that by 1975 the Communist Chinese will have a diesel submarine ballistic missile capability against which ABM will be ineffective."

MY COMMENTS

The Sentinel system was designed to counter an early Chinese threat and therefore was not specifically designed to handle any of the systems in the quoted paragraph other than to accept hardware upgrading (such as additional radar faces) to handle such threats if and when desired. My comments regarding each of these specified threats are as follows:

Fractional Orbital Ballistic System

Sentinel as designed would not maintain area coverage against FOBS.

Southern Orbital Ballistic System

No coverage was provided simply because there were no southern facing radars.

Multiple Independent Reentry Vehicle System

Sentinel could intercept MIRV's as well as single RV's but the system would be more rapidly exhausted of its interceptors. The same comment holds for

Multiple Independent Rockets

There would not be a traffic handling problem.

Submarine Close Range Missile

Again, the system was not designed with seaward facing radar faces. It was the judgment of the Defense Department that the Chinese would be more likely to have operational ICBM's before they fielded a submarine ballistic missile capability, at which time such coverage could be added.

Very truly yours,

DANIEL J. FINK.

MASSACHUSETTS INSTITUTE OF TECHNOLOGY,
Cambridge, Mass., March 13, 1969.

Mr. WILLIAM B. BADER,
Committee of Foreign Relations,
U.S. Senate, Washington, D.C.

DEAR MR. BADER: At the Foreign Relations Hearings last week I was asked to comment for the record on the enclosed newspaper excerpt. My comments follows:

The warning time for Sentinel is provided by the Perimeter Acquisition Radars (PARs) along the northern U.S. border. An area can be protected from each Spartan Site whose dimensions depend the warning time received from the PARs. This coverage area is called a "footprint". When less than adequate warning time is available, the size of the footprint shrinks. Inadequate warning time can be a consequence of failure to "look" in some directions or it can be a consequence of a special characteristic of a trajectory.

In the case of FOBS because of its low trajectory the warning time may be reduced from perhaps about 10 minutes to about 3 minutes. The footprint for Spartan coverage would therefore shrink and large gaps in coverage area would result.

For southern orbital ballistic missiles and for short range submarine launched missiles, PAR warning would be missing entirely (with the Sentinel system as planned in January) and Sentinel would be ineffective as an area defense.

Multiple warheads whether independently guided or not or whether independently boosted or not if used in sufficient number can exhaust Spartan missile farms.

Sincerely yours,

J. P. RUINA.

ITHACA, N.Y., *March 11, 1969.*

In response to the questions put by Senator Symington, I submit the following discussion of the points raised by Everett S. Allen in the New Bedford Standard-Times in an article "The Case Against ABM–VI".

It is correct that the Sentinel system as designed will be no good against a fractional orbital ballistic system, or a southern orbital ballistic system. However it can be modified to deal with these threats by adding radar faces directed south of the PAR radars. Both of these possibilities, a fractional orbital system and the southern orbital ballistic system, are very advanced developments which are not likely to occur in China for at least ten years after their first ICBM capability. This is in contrast to decoys, balloons, blackout and probably chaff, which the Chinese could develop much earlier and at much lesser expenditure. The southern orbital ballistic system is of very questionable usefulness.

A multiple independent reentry vehicle system, or a group of independent multiple rockets would require intercept by several Spartan missiles, at least one and probably two for each reentry vehicle. This is clearly a good way to exhaust the defense but apart from this the Sentinel system is quite capable of dealing with this threat. The multiple independent reentry vehicle is again an advanced development, not likely to occur within the first ten years of the Chinese ICBM capability.

The submarine close-range missile is indeed a very believable threat from Communist China. As Dr. Fink mentioned during our session on March 6th, the capability of the Sentinel system against such a threat would be seriously degraded. We would have to rely largely on the U.S. Navy to find and deal with the Chinese submarine before they can fire their missiles.

Dr. H. A. BETHE.

ABM SYSTEM AGAINST HARBOR BOMBINGS

Senator SYMINGTON. Now I would ask a question or two. Suppose you first put up a thin system, then a thick system, and then an antagonist decided to take say seven ships under different flags, and place those ships into the seven largest harbors in the United States; ships with false bottoms to quietly slide a nuclear weapon into each harbor. Then the ships would leave and a week later all the weapons went off together, hydrogen explosions in water, with the more lethal result because of explosion in water, and this would destroy the seven largest ports in the United States.

A thick or thin ABM system would not have any effect on such a development, would it? Dr. Bethe, is there a possibility that can happen?

Dr. BETHE. There is always a possibility. It has among other things the feature that you do not know who did it and, on the other hand, it is certainly not an instrument of military policy, of military tactics.

I do not know what it would accomplish for any power that wanted to do so. I think these total nuisance attacks, which are certainly very possible and very hard to guard against by any means, have only this one feature, that usually nations employ weapons in order to accomplish an end and I do not see which nation would accomplish any end by such an attack.

For this reason also, as I stated in my testimony, I do not see what the Chinese could hope to accomplish by sending a missile attack of a few missiles against us.

Senator SYMINGTON. Dr. Ruina, would you comment?

Dr. RUINA. I would agree completely.

Senator SYMINGTON. Dr. Fink.

Dr. FINK. Completely.

Senator SYMINGTON. But China, even today, is far from the only country possessing nuclear weapons. Now, as we all know, the first atomic bomb was designed around the bomb bay of a B–29; the weight, as generally agreed, is some 10,000 pounds.

Since then progress in the art has resulted in steadily more lethal effect, more blast, with steadily less weight; is that correct, gentlemen?

Dr. BETHE. That is correct.

SUITCASE BOMBING

Senator SYMINGTON. With that premise, suppose somebody came with a large suitcase to a hotel, took some rooms for a weekend, said they had valuables and would nobody look around the room, took the keys, said they were going to visit some relatives in Virginia, then took a plane to another country.

In the resultant explosion a day or so later, any thick or thin ABM system would not have much effect, would it?

Dr. BETHE. It would have no effect on that. But it is an operation of the same type, and surely the Soviet Union would not be likely to engage in such an operation because if they ever want to start a war against us, they presumably want to accomplish something and this would not accomplish anything except make us very angry.

Senator SYMINGTON. Again, you would not know who did it.

Dr. BETHE. Definitely not. And it might very well be that Albania, which was mentioned before, might do this in order to make us angry against the Soviet Union.

Senator SYMINGTON. It would seem a good argument for the Non-Proliferation Treaty.

Dr. Ruina, do you have any comment?

Dr. RUINA. No. I would agree. I do not see any possible reason for anybody to use a weapon like that.

I also would like to point out that whereas the ship has some kind of technical feasibility, the suitcase does not for some time. I think the Chinese are a long way off from getting that kind of performance out

of nuclear weapons so that we have to worry about it. The Soviets would put the suitcase in a missile back home.

Senator SYMINGTON. Dr. Fink.

Dr. FINK. I cannot improve on that.

DESIGN OF OUR WEAPONS RADARS

Senator SYMINGTON. Again, more countries have the weapon than just the Chinese. We like to design our weapons radars the way we hope we would be attacked.

I do not see why we can continually plan our decisions as to where our defenses should be based on the way we hope the enemy will attack, not in any way sure they would, especially with their development of submarines. I do not see why it would be any more credible for them to do it in one of those two ways than it would be to make a preemptive strike against the United States. In the latter case their losses would be tremendous, and we could pin the rose on exactly who did it.

Would you care to comment on that, Dr. Bethe?

Dr. BETHE. Well, Senator, I still think that a serious power, a great power, like the Soviet Union, would not do it this way and——

Senator SYMINGTON. Do you think they would do it any other way?

Dr. BETHE. I do not think they would do it the other way either.

But I would believe that the only thing they might possibly do is to make an attack against our military capability, in which, incidentally, they might also destroy some cities.

But they would do this only in desperation, and I am sure that our main effort must be to make it unattractive for them to do so.

Senator SYMINGTON. Dr. Fink.

Dr. FINK. Well, I agree with Dr. Bethe.

I found it very difficult over the years to try to foresee areas where suitcase bombs become suitable. But certainly other avoidance of any system, you know, is real, whether it is submarines or coming from the south. That, I think, is very well taken.

Senator SYMINGTON. Dr. Ruina.

Dr. RUINA. I have nothing further to say.

BRINGING THE TRUTH TO THE AMERICAN PUBLIC

Senator SYMINGTON. Mr. Chairman, before closing, may I congratulate you on these hearings; on the idea of the hearings, so as to give the American people the truth with respect to this proposed system; and on the quality of the distinguished witnesses you have brought here to open the subject.

Senator GORE. Thank you very much.

Senator Pell.

Senator PELL. Mr. Chairman, I would like to endorse that statement of Senator Symington's.

I would hope that you, Mr. Chairman, would at some point give the American public the nature of the Soviet reaction to discussions you had with Premier Kosygin in Moscow a few months ago.

I also was very interested in Senator Symington's line of questions. I recall a line of questioning along the same line with, I believe, Gen-

eral Wheeler, a couple of years ago on the subject of whether nuclear weapons could be brought into the United States, maybe in shrimp boats and distributed in containers. The Senator also wrote a very interesting piece on it afterward.

I believe the Defense Department said, as you did afterward, there is no possible defense against that type of military infiltration.

Would it be an oversimplification to say that, Dr. Fink is for a thin ABM system; and Dr. Bethe and Dr. Ruina are opposed to any development of an ABM system?

Dr. FINK. I think that is correct.

Dr. RUINA. Against deployment.

Senator PELL. Any deployment.

DIRECTION OF RADARS

Isn't the question of against whom a system is directed or from whence you want the protection, determined by where the radars are situated. I notice in Dr. Fink's statement he showed a map of where the radars would be for this thin ABM system, and those radars were pointed north directly against the Soviet Union. I think with all this discussion about a thin shield against the Chinese, they don't have the radars situated on the west coast against China.

Wouldn't that refute the point that this system is meant to be against China?

Dr. FINK. No, Senator Pell. I think unfortunately we do not have a good global map.

Senator PELL. A pretty good map you have there.

Dr. FINK. If you had a polar map of the world you would see that actually missiles coming from China and the Soviet Union almost overlap, so you cannot distinguish where a radar face is pointing between an attack from the Soviet Union and China. Essentially they both come from the north, plus or minus 20°.

Senator PELL. Where do you believe the radar faces in the Galosh system are pointing, toward China or toward the United States?

Dr. FINK. I guess I should not answer that question.

Senator PELL. Because of your previous classified knowledge?

Dr. FINK. Yes.

Senator PELL. Thank you.

Dr. BETHE. May I add one point? As far as I am aware, there is an intention to have PAR radars also directed toward the west, and certainly there are Spartan sites planned for the west coast, and I think it is well designed for coverage against China as well as the Soviet Union.

Dr. FINK. Senator, if I may try to make something clear on the point that is coming up over and over again on these defense systems, in terms of the technical design. Sentinel was essentially designed to face an attack from the north, which could be the Soviet Union; it was sized for China. We should not make any issue about the inability or ability to defend toward the sea because it is not that expensive to add a radar face to any given side facing east or west. So it is not a large addition.

In that sense it could be added any time anybody wants to. That is true for the Russian system, whichever way it faces.

CASUALTY RATE IN AN ALL-OUT EXCHANGE

Senator PELL. Do you believe if the statement is correct, if everything remained at status quo, and we all believe it will not with the addition of this system, that in an all-out exchange, it would reduce the casualties in the order of from 120 million to 40 million? Or is this an overstatement?

Dr. BETHE. Not the Sentinel.

Senator PELL. Not the Sentinel. That would be the thick system.

Dr. BETHE. Yes.

Senator PELL. Not the thin system.

Dr. BETHE. Yes.

Senator PELL. In other words, there has been some misconception as to the effect of the thin system.

Dr. BETHE. Yes.

Senator PELL. In fact, some "misconception" is a mild term for it because I think the American people have come to the conclusion that this "modest" $5 billion expenditure would save 80 million lives. That is not a correct statement.

Dr. BETHE. That is not correct.

Senator PELL. Thank you.

I have another question bothering me—I am delighted to have this panel of scientists who are here—what would be the effect of an all-out exchange; does it mean the end of homo sapiens, does it mean the end of the 20th century civilization? What is the effect of this many weapons going off? Would it leave the Southern hemisphere obliterated, unlivable?

Dr. BETHE. It is my opinion that it would not mean the end of homo sapiens. It would not mean the end of human habitation in the United States.

It would mean a complete destruction of the civilization which we now know in the United States. It would mean an end of the functioning of our very complicated and interlocking industrial civilization for a number of years to come, and certainly until somebody else helps us to reconstruct.

It would mean, if it were an exchange in which Europe as well as the Soviet Union and the United States were involved, it would mean, in my opinion, a setback of world civilization at least comparable to the end of the Roman Empire in 476. It would mean chaos, civil chaos thereafter.

It would not mean the end of the human race. It would leave the Southern hemisphere habitable, but I want you to contemplate the concentration of industry in the Northern hemisphere, and to contemplate that a reduction of the status of world civilization to that of the Southern hemisphere would be a very, very serious setback.

Senator PELL. I take it you other two gentlemen would agree with his general assessment.

FALLOUT IN EXPLOSIONS

Finally, would it be possible to have nuclear weapons set up in such a way that they would explode when intercepted, thus giving a double explosion so that when intercepting there would be a kickback?

Dr. BETHE. I do not foresee that this would be a serious effect as far as radioactivity is concerned.

The fallout of which we are all so justly afraid comes about by surface explosion which sweeps up a great amount of dirt, and that makes it possible for the nuclear fragments, for the fission fragments, to fall out in the neighborhood of the explosion, and that is very, very serious indeed.

On the other hand, if you have high altitude explosions, we know from experience, with the high altitude tests, that it takes years until these come down to earth. It takes years, and during these years the radioactivity very strongly decays, so that relatively little is left.

In addition to that, it is a worldwide distribution of radioactivity, which does not give any very great concentration at any one point.

There have been studies to estimate how many thousands of megatons could be exploded either near the surface or at high elevations without seriously affecting mankind, and as one happy note, I can say if you explode all missiles which now exist this is well below that limit.

The bomb load of planes is more serious, but it is still below that limit.

LIFETIME OF RADIOACTIVITY

Senator PELL. Finally, as I understand it, nuclear weapons depend on radioactive substance for their force, and radioactive substance has a half life. Let us assume that no more weapons are added to the stockpile but they stay as they are. For how long a period of time would there be this half life?

Dr. BETHE. Senator, I have to correct the statement. The destructive effect of the weapons depends on the blast they create, and on the fires they set, and this destructive effect would exist no matter whether there is radioactivity or not.

There is, in addition, the radioactive effect. This does not give immediate destruction, but it gives serious effects on the population following.

It is my belief that the radioactive effects are, on the whole, less serious than blast effects and fire effects, but they are certainly still serious.

Now, the radioactivity is created only in the explosion. The radioactivity does not exist in the nuclear weapons as they sit in the silos or in the bomb bays. There is some radioactivity from these. For instance, plutonium is a radioactive material, but that is not the serious radioactivity. The important radioactivity is that of the fission products which are produced during the explosion, and it is that with which we should be concerned.

Senator PELL. In other words, a nuclear weapon has no limit timewise as to its effectiveness.

Dr. BETHE. That is correct, within limitations.

There are some parts of the nuclear weapons which themselves have radioactive materials, and they have certain half lives, and they will have to be replaced so that the nuclear arsenal has to be reconditioned every so many years, every decade or so.

Senator PELL. This is my question. What period of time must elapse before it becomes ineffective if it were not reconditioned?

Dr. BETHE. That is essentially the lifetime of plutonium, which is 20,000 years.

Senator PELL. Thank you, Mr. Chairman.

EFFECT OF ATOMIC EXPLOSIONS ON POPULATION

Senator GORE. Distinguished witnesses, I apologize to you. You have been now here three and a half hours. I express the deepest gratitude on behalf of the U.S. Senate, and now I must impose on you further because we have left relatively untouched a very important phase of this matter that is now under consideration.

I would have a number of detailed questions about it, but because of the pressure of time, I would like to state the proposition and then begin with Dr. Ruina and ask each of you to comment on it.

One phase we have not talked about is the effect on the population if our own atomic explosions, Sprint, et cetera, are exploded over cities: How many people does it blind, how many will suffer from radioactive fallout, et cetera? But let us come now to this one question which we relatively have not touched.

EFFECT OF ABM ON OUR MISSILE SITES

What effect would the deployment of an ABM have upon our own missile sites? Would the detonation of Sprint nuclear missiles disrupt communication between our missile systems? Would it have an effect upon the population? Would it have blackout effects? Would it be necessary for the United States to match one Sprint for every ICBM fired at us by an opponent?

Let's discuss the general subject, Dr. Ruina, of the effect of deployment of an ABM system for defense on our own Minuteman missile sites.

Dr. RUINA. Considering our basic strategic posture, which has been discussed by Mr. McNamara year after year, the most vital element in our military strategic posture is the protection of our deterrent; making sure that it is clear to us and certainly to the Soviet Union, that we can, even after receiving a nuclear strike from them, retaliate in kind.

Our ability to do this depends on our ability to protect our Minuteman sites, which are on land, to protect our Polaris sites, which operate by hiding in the sea, and to protect our bombers, which are very difficult to protect on the ground, and may have to go into the air alert with proper strategic warning.

At this point, we have a great deal of confidence—by seeing whatever we see the Soviet Union has, that every element of the strategic force has sufficient survivability to do a tremendous amount of damage to the Soviet Union.

Senator GORE. You mean air, missile, and submarine.

Dr. RUINA. Yes; air, Polaris, and Minuteman.

When we project future Soviet capabilities, and we see that, perhaps, one or two of these elements of our deterrent force may be in jeopardy, we very properly get rather nervous. We are reluctant to rely completely on only one system.

To get Minuteman, the Soviet Union must first know precisely where the silos are, and I assume that they do.

They would have to have fantastically high accuracy so that they can pinpoint the "shot," and they must have sufficient warheads and lots to spare, to get at every one of our Minuteman sites.

For a successful first strike you must be sure you get almost everything, if not absolutely everything.

The development of MIRVs which has been talked about rather freely in the press, allows each missile to have several, perhaps two, three, four, 10, 12, if it is a large one, perhaps even 15, independent reentry vehicles on board, each one of these reentry vehicles can destroy a Minuteman site. Projecting far into the future, we see no reason why technologically it will not be possible for the Soviet Union, with a reasonable number of missiles, to have the capability of destroying all our Minutemen.

HARD-POINT DEFENSE

There are several ways to counter this. One is to say, let us forget about Minutemen. We will concentrate on Polaris and airplanes and other weapons. Perhaps we can make our missiles mobile, move them around; or we can stay on top of the situation by proliferating Minutemen or the equivalent; let us have many, many more.

But one approach is to protect the Minutemen, with active defense not very different from the system we are talking about for our cities, although in detail it would be different.

There is a very important difference in the arithmetic of hard-point defense and population defense, and it is important to recognize that difference in arithmetic.

If 10 missiles are heading for a large population center, and nine are stopped and one gets through, the city is destroyed. So the defense has to be airtight to be effective.

In the defense of hard-point, of our Minuteman silos, the fact that a system can defend at all gives it great value. The fact that there will be some Minutemen left would give the other side pause before they would go into a first strike.

So that the requirements, just the technical performance requirements, of the defense system are entirely different to protect Minutemen than they would be to protect cities.

Also, you do not have to protect a very large area. You are protecting a very small area, so the intercepting missiles can have short, very short range.

The radars also have to operate only over short range.

I believe the use of hard-point defense is, by and large, an excellent technique for maintaining our deterrence, and I think no one will argue whether it should eventually be one of the items in our inventory. But the question of whether we proceed with a given system depends in detail on the technical evaluation, the performance, and the relative cost of all the alternatives available to us.

SKEPTICISM EXPRESSED ABOUT SENTINEL DESIGNED FOR MINUTEMAN DEFENSE

Sentinel, for hard-point defense, may be useful, and it may be the right thing, but I am somewhat skeptical—not negative. My skepticism comes from the fact that Sentinel was not designed for hard-point defense. Its components were designed for a different pur-

pose. We cannot say that this system is the best current technology can offer to protect Minutemen.

One has to raise the question whether we could not design a better system, and I do not know. I have not studied that question in detail. That is why I approach it with some skepticism. I would want to look at what other alternatives there are, and I do not feel any special time urgency in doing this.

I do not think that at this point the strategic situation or the technological situation requires that we must with great urgency move out and protect the Minutemen sites.

I think eventually we will want to protect our Minuteman sites, but I would like to examine the technology and alternatives carefully first.

Senator GORE. As a politician, I could not be relaxed about anything like that.

But to get a meaning from your statement, do I understand that you would be relaxed for a year or so? Would you favor delaying deployment for either the purpose of further research and development or for the purpose of exploration of the possibility of a strategic weapons agreement with the Soviets or both?

Dr. RUINA. Well, certainly, if the talks with the Soviets are imminent, that certainly is an extremely important matter that one should delay things for.

But I would argue that, perhaps, the Department of Defense has studied this thing carefully and, perhaps, they have a very convincing case for an immediate deployment of Sentinel for Minuteman protection.

If they do, I do not know what it is. Just from what I know, I would say that one can wait a while and study the problem further, and make sure this is the right thing to do.

My skepticism comes from the fact that we are using a system designed for a different purpose to move quickly in for this purpose, and I wonder whether it is necessary with such urgency.

Senator GORE. You would think then there should be a delay under the present circumstances?

Dr. RUINA. I would, yes.

Senator GORE. Dr. Bethe.

Dr. RUINA. With the information I have.

Senator GORE. Yes, I understand.

PRESERVING SEVERAL WEAPONS SYSTEMS

Dr. BETHE. I entirely agree with Dr. Ruina's assessment of this. I entirely agree that we want to have several weapons systems operational at any one time; secure systems, which are designed to give us a second strike capability against the Soviet Union.

I think it would be, any one of the systems, bombers, Polaris, Minuteman, has its own vulnerability, and I would like to see all three systems preserved.

Therefore, in principle, I am very much like Dr. Ruina in favor of seeing to it that our Minuteman system or a similar system remains effective and remains secure from possible Soviet attack.

Like Dr. Ruina, I am afraid, I would say there is a technical possibility that some day the Russians may be able to have enough MIRVs

of enough accuracy to attack our Minuteman successfully. They do not now. It is not foreseeable when it will happen.

It surely will not be next year. It probably will not be for quite a number of years. They need both the MIRV and the tremendous accuracy required to hit such a strong silo successfully before this is a real threat to our Minuteman system.

If and when such a threat develops, then I think we should do something about it, and Dr. Ruina has said that there are several ways to counter this possibility. One of them is a defense by an ABM system.

I again agree with Dr. Ruina that the Sentinel system is not specifically designed for this purpose. It will do, and if the Sentinel system is deployed anyway, then I would be very much in favor that it also be deployed around our Minuteman sites.

But if we only want to defend Minuteman sites, then I think it should be possible to design a more effective system, a cheaper system, and I surely would agree that there is 1 year's time, 2 years' time, before making that decision.

Senator GORE. Would you favor immediate deployment then, or delay in order to explore these possibilities?

Dr. BETHE. I would favor delay.

Senator GORE. Dr. Fink.

Dr. FINK. Mr. Chairman, as you might expect, I have some disagreement with my colleagues.

UNBIASED AND OBJECTIVE INFORMATION SOUGHT

Senator GORE. I would like to take this opportunity to point out that a number of people have commented that these hearings would be one-sided and designed to prove one point or another.

This panel has gone for 4 hours. At least the people here will realize that this is genuinely an effort to explore and develop a body of information on as unbiased and objective a way as possible.

The committee would be happy to have you testify.

THREAT FROM SOVIETS NOT FAR OFF

Dr. FINK. The main point I disagree with is the feeling I got from both of their statements that this threat to our force by the Soviets was quite a ways off, and I think I take issue with that.

I might add that I am as concerned about arms control as anybody else, and have actively worked on it in various ways.

But I must point out in the Soviet Union over the past few years they have not exhibited much restraint. They are expanding their ICBM force at a very fast rate and, to my knowledge, it is still going on.

Their numbers look like they are going to be in excess of ours. They are pushing ahead with a Polaris-like force. They have tested the fractional orbital bombardment system, for what reasons we really do not know. So there are changes.

The threat to the Minuteman I do not believe depends upon MIRV, for example, because there are numbers of land-based missiles that are matching or will more than match Minuteman. Some of these are getting very large, I think 10,000-pound payload.

Dr. Ruina used the words "fantastically accurately." That is incorrect. They do not need fantastic accuracy, certainly for their larger missiles; for the smaller ones they have to do better. So I am concerned about that threat to Minuteman.

I do not feel too relaxed about it at this point in time.

USE OF NIKE X COMPONENTS

Now, a couple of other comments on the use of Nike X components, primarily the Sprint and MSR for defending Minuteman.

There were considerable studies to look at those components versus totally new ones to do that job, and I think, generally, in the Defense Department, the consensus was that these come pretty close.

You might optimize slightly differently in terms of missile, and so forth, but not enough to make any real difference.

REDEPLOYMENT OR REDESIGN OF SENTINEL SYSTEM

Senator GORE. Then would you, as an American, with your experience and background and knowledge, would you favor redeployment or a redesign of the Sentinel system and deployment to defend our missile sites, or would you favor delay for either research or development or to explore the possibilities of agreement with the Soviets?

Dr. FINK. I think that in terms of redeployment, I would favor that. In terms of delay, I would want to look at that very seriously. I would have to reassess the current data before I can make a judgment.

Let me say this, I would not at this point recommend delay because I am concerned.

Senator GORE. Dr. Bethe.

SOVIET FIRST STRIKE AT MINUTEMAN

Dr. BETHE. I think Dr. Fink may very easily be right that the present MSR and Sprint combination is a perfectly adequate system to defend Minuteman.

I still think that, however, we might do better if we did not have the other city defense also in mind.

However, I think the numbers will show that we need not be afraid of a Soviet first strike to eliminate Minuteman.

Suppose the Soviets and we each have a thousand missiles, and that is very close to the present situation. Any missile has a limited reliability, and if we put that at 80 percent, I think we are doing pretty well, so if the Soviets would put it into their heads to send their thousand missiles against our Minuteman, then in spite of the fact that their missiles carry big warheads they would only destroy 80 percent of our Minuteman sites, which would mean that we would be left with 200 Minutemen, and they would be left with nothing, surely not a profitable procedure.

In addition, of course, we would be left with the Polaris.

CONCERN ABOUT MULTIPLE WARHEADS

The point at which I begin to be afraid is really the point when there are many warheads in one missile. If they have a thousand missile sites, each with 10 warheads, then I am afraid, but then each of these

warheads will have low weight and, therefore, low yield, and then we do need, or rather they do need, the extreme accuracy that Dr. Ruina has talked about if they wish to destroy a Minuteman.

So I think we have two possibilities with the present numbers. I feel perfectly relaxed with the present numbers. If they continue to build more missiles, then I am very much concerned, but I would be concerned in any case, and this is just what an arms control agreement is about. I think they do not do so.

If they put in MIRV, then I am concerned even with the present numbers. But I begin to be concerned only when that MIRV has very high accuracy.

Senator GORE. Any further questions, Senator Cooper?

ABM DEPLOYMENT AROUND MISSILE SITES

Senator COOPER. I think you have covered it, but I think this issue is going to become the relevant and important issue before the Senate, and it may be that this will be the administration's proposal.

But is it correct that if the present system is the one that is recommended, to change it to the protection of the missile sites would only remove one element, the Spartan missile; is that correct?

Dr. BETHE. That is correct.

Senator COOPER. The PAR, perimeter acquisition radar, the missile site radar, and the Sprint remain.

Dr. RUINA. You also change the location.

Senator COOPER. Of course, you change the location. You change the missile sites from the cities.

Dr. RUINA. So we really then have an ABM system as projected last year and as contemplated this year.

Dr. BETHE. If the administration decides to deploy ABM only around our missile sites, then it will be different from the present system. It could at least be different. It may not have the PAR and it may not have the Spartan, and if that is the case, I would imagine that the Russians would feel much less threatened by such a system.

Senator COOPER. Of course, this goes to the credibility of our deterrent, does it not, the survivability?

DO SOVIETS HAVE ABM SYSTEM TO PROTECT MISSILE SITES?

Do you have any knowledge that the Soviets have a modified ABM system to protect their missile sites?

Dr. BETHE. Not to my knowledge.

Senator COOPER. So then again, unless we believe that our present deterrent is ineffective and not credible, then again the United States embarked on a new element in this arms race; is that correct? Would you say that is correct?

Dr. BETHE. I would say that is correct. But I would also say that it would not be destabilizing because it would preserve our posture of assured destruction and deterrent and not add any element of damage limitation.

Senator COOPER. Do you all three agree with that? Do you agree?

Dr. FINK. Yes.

Dr. RUINA. I think there is another factor, Senator Cooper, and that is we know what we are going to do with 3 or 4 years' lead time. We are now talking about Sentinel for hard point, and you won't see it emerge for many years. If we were already seeing the Soviets building a hard point, they would be 4 years ahead of us and you must take that into account when you say that we are starting something or not.

They know what we are doing immediately. They are watching these hearings. We do not know what they are doing.

Dr. FINK. Another point, Senator, they may go a different route. Senator, they may try to protect their land-based missiles by making them mobile, something which we considered and discarded.

DANGER IN DEPLOYMENT DELAY NOT SEEN

Senator COOPER. I think you have already answered the question which I intended to direct to you, but Senator Gore did. I think two of you said you did not think there was any more danger by delaying this for a year upon the possibility of negotiations, the same question I asked before; is that correct?

Dr. BETHE. Yes.

Senator COOPER. Do you agree with that, too, Dr. Fink?

Dr. FINK. You said two of us?

Senator COOPER. Yes. Which two?

Dr. FINK. Those two.

Senator COOPER. All right.

Senator Gore, might I just say I, too, want to join in congratulations to you for holding these hearings. I think you have performed a great service for the Congress and for the American people.

Senator GORE. Thank you, Senator Cooper.

To show our appreciation I will invite you gentlemen to be guests of the subcommittee next Tuesday, to hear Dr. George Kistiakowsky, Dr. Herbert York, and Dr. James R. Killian.

Secondly, I invite you to have lunch with me.

The committee is adjourned.

(Whereupon, at 1:45 p.m., the subcommittee adjourned, to reconvene at 10 a.m., on Tuesday, March 11, 1969.)

STRATEGIC AND FOREIGN POLICY IMPLICATIONS OF ABM SYSTEMS

TUESDAY, MARCH 11, 1969

UNITED STATES SENATE,
SUBCOMMITTEE ON INTERNATIONAL ORGANIZATION
AND DISARMAMENT AFFAIRS OF THE
COMMITTEE ON FOREIGN RELATIONS,
Washington, D.C.

The subcommittee met, pursuant to recess, at 10 a.m., in room 4221, New Senate Office Building, Senator Albert Gore (chairman of the subcommittee) presiding.

Present: Senators Gore, Fulbright (chairman of the full committee), Sparkman, Pell, Aiken, Case, and Cooper.

Also present: Senators Kennedy and Percy.

Senator GORE. The committee will come to order.

The Subcommittee on International Organization and Disarmament Affairs continues its hearing today on the strategic and foreign policy implications of anti-ballistic-missile defense systems.

Last Thursday, the subcommittee had the benefit of informative testimony from some of the country's finest scientific minds on the merits, weaknesses, and purposes of anti-ballistic-missile defense systems, its merits and demerits.

FORMER PRESIDENTIAL ADVISERS

Today, in order to continue the efforts of this subcommittee to assist the Senate and the public in developing a better understanding of the anti-ballistic-missile issue, we have the privilege of hearing from a number of former Presidential science advisers. On behalf of my colleagues, I wish to welcome Dr. Herbert York, whom I have known for a long while, professor of physics at the University of California at San Diego; Dr. George Kistiakowsky, professor of chemistry at Harvard University; and Dr. James R. Killian, chairman of the board of the Massachusetts Institute of Technology.

I would hope that our witnesses will assist the subcommittee this morning by commenting generally on the testimony of our witnesses of last week. I would also hope that they will expand the dimensions of the discussion in order to clarify the relationship of the ABM problem to the prospects for arms control negotiations with the Soviet Union and, equally important, what any such negotiations could achieve.

The anti-ballistic-missile issue now before the country is not the first time there has been a national debate at a critical juncture over the production and deployment of a new and expensive weapons system. Our witnesses today are uniquely qualified to tell the Senate and the public something of the decisions of previous administrations regard-

ing offensive and defensive missile systems, and then draw for us those lessons relevant to the momentous decision now facing the Nation.

We would like to begin with the witnesses in this order: Dr. York, Dr. Kistiakowsky, and Dr. Killian, and then hope they will sit together at the witness table, each giving an initial statement and then responding as a panel to the questions of the subcommittee. I would like inserted at the beginning of each testimony a biographic sketch of the witness.

The subcommittee is pleased to have the distinguished senior Senator from Massachusetts present who wishes to introduce two of his constituents to the committee.

Senator Kennedy?

Senator KENNEDY. Thank you very much, Mr. Chairman.

ABM SYSTEM A SIGNIFICANT AND IMPORTANT ISSUE

First of all, let me extend a word of appreciation on behalf of all the Members of the U.S. Senate for the splendid work being done by this subcommittee, under your leadership, Mr. Chairman. The extraordinary experience that is being brought to the Members of the U.S. Senate, in terms of helping us to understand one of the most complex, but, as you indicated earlier this morning, one of the most significant and important issues before the U.S. Senate and before our Nation, is almost unparalleled.

Let me say what a pleasure it is to have the opportunity to introduce two people who have served the Nation with such distinction and who come from the State of Massachusetts. Their careers have been entwined in public service for so many years that they have achieved an excellence and a commitment and concern for the public weal which has not only brought the great appreciation of and great recognition to these two men's careers, but I think has brought the appreciation of all Americans.

Dr. Kistiakowsky is, as you know, Mr. Chairman, a professional chemist and as such has been recognized the world over, receiving awards for his work from the governments of many countries. And Dr. Killian has distinguished himself not only as an adviser to Presidents, but also in the development of the public broadcasting system which I think all of us recognize was again a mark of his distinguished service.

Let me just say, Mr. Chairman, briefly, how much I think the work of this committee in bringing these two gentlemen, as well as Dr. Herbert York, whom I have known for a good many years, and the other distinguished witnesses who have appeared and who are scheduled to appear before the Members of the Senate to discuss the Sentinel anti-ballistic-missile system, has contributed to the considered judgment of this complex issue.

AT CROSSROAD ON FOREIGN AND NATIONAL DEFENSE POLICIES

Whether we should or should not deploy the Sentinel ABM, and if we should, in what form it should be constructed, is a question which places us squarely at a crossroad in this Nation's foreign and national defense policies.

We have an unparalleled opportunity now to move aggressively toward our common goal of world peace by discussing with the Soviet

Union and the other nuclear powers the shape and form of nuclear disarmament agreements.

We know that our nuclear deterrent is sufficient to destroy the Soviets many times over in the event they attack us. We now can destroy Communist China similarly. Deployment of the ABM system now—a system which in the eyes of many of our best experts would not work—would hardly increase our own security and it will almost certainly increase world tension. This is why I oppose the Sentinel ABM system, as it is presently configured, and why I have supported the continuing research and development activities related to an antimissile defense.

I want to say, Mr. Chairman, that Dr. Jerome B. Wiesner and Prof. Abram Chayes are presently preparing an extensive report for me, as well as for my colleagues in the Congress, on the whole question of the Sentinel ABM. I am sure that as you acquire and develop your testimony, the kind of record made by this committee, and hopefully the kind of suggestions and ideas and comments that are brought by this study being done by Dr. Wiesner and Professor Chayes and other experts, will benefit the Senate itself, and will benefit it significantly, because of the informed ideas which are brought to bear on this question.

I appreciate very much the opportunity of extending a word of welcome, a word of introduction to the members of this committee, and for the courtesy of letting me appear here.

Senator GORE. Thank you, Senator Kennedy.

The subcommittee hopes you will remain. All Members of the Senate, as I stated on the floor of the Senate yesterday, are invited to sit with the subcommittee.

(A biographic sketch of Dr. York follows:)

BIOGRAPHIC SKETCH OF HERBERT YORK

Born: November 24, 1921, Rochester, New York.

Educaton: University of Rochester, B.A., 1942; M.S. 1943; University of California, Berkeley, Ph.D., 1960; Case Institute of Technology, D.Sc. (hon.), 1960; University of San Diego, LLD (hon), 1964.

Experience:

1943–58: Member research and teaching staffs of Lawrence Radiation Laboratory, University of California, Livermore.

1952–58: Director of above.

1958: Research administrator of Institute for Defense Analyses, Washington, now trustee.

1953–61: Director of Defense Research and Engineering. Department of Defense, Washington.

1961–64: Chancellor of University of California at San Diego, La Jolla California, now professor.

1957–58: Member of the President's Scientific Advisory Committee.

1964–67: same (Vice Chairman 1965–66).

Consultant government and industry.

Trustee Aerospace Corporation, El Segundo, California.

Awards and Memberships:

Recipient Ernest Orlando Lawrence Memorial Award of AEC, 1962.

Member of American Physics Society, International Academy of Astronautics, Phi Beta Kappa, Sigma Xi.

Research and Publications: Research and publications in application of atomic energy to national defense, elementary particles; high energy physics, nuclear weapons and power defense research.

Address: 6110 Camino de la Costa, La Jolla, California, 92037.

STATEMENT OF DR. HERBERT YORK, PROFESSOR OF PHYSICS, UNIVERSITY OF CALIFORNIA AT SAN DIEGO

Dr. YORK. Mr. Chairman and members of the committee, I appreciate very much the opportunity to appear before your committee. I have already had a chance to read some of the testimony presented before this committee last week, and I will confine my prepared statements to a brief description of my own role in ABM matters and to certain other factors which either may have been overlooked in prior testimony or which might well be reemphasized.

ROLE IN ABM MATTERS

I came to Washington to work in the Government immediately after Sputnik in 1957, and remained here until 1961. I was first a member of President Eisenhower's Science Advisory Committee under the chairmanship of Dr. James Killian, then Chief Scientist of ARPA, and then Director of Defense Research and Engineering under Secretaries McElroy, Gates, and McNamara. During that period I endorsed and supported the R. and D. part of the Army's Nike-Zeus program, and I helped to create and promote ARPA's more advanced BMD—ballistic missile defense—program. It was also my responsibility to advise the Secretary of Defense on a number of occasions over a period of several years about the proposal to deploy the Nike-Zeus ABM. I strongly recommended against such deployment each time. It was the era of the supposed "Missile gap" and accordingly that was not a popular recommendation. I am, of course, pleased to note that nowadays virtually everyone agrees that Nike-Zeus should not have been deployed. My decisions and recommendations in those days were based almost exclusively on technical considerations. In brief, the recommendation not to deploy the Nike-Zeus was based on my technical judgment that it would become obsolete before it could be deployed. The detailed reasons behind this conclusion were similar to those contained in the testimony given last Thursday by Hans Bethe, Daniel Fink, and Jack Ruina.

Soon after I left full-time Government service, I became a member of the General Advisory Committee of the U.S. Arms Control and Disarmament Agency. In that capacity, I have not only had the opportunity to keep abreast of the technical status of the ABM, but I have also had the opportunity to be exposed to and involved in considerations of the political ramifications of the ABM, especially as they relate to arms control issues.

TECHNICAL DETAILS OF PROPOSED ABM SYSTEM

Last week's testimony before this committee described the Nike-Zeus and Nike X systems and the problems their designers faced in attempting to find a way of coping with the Soviet offensive capability. The complex technical details of the situation were outlined then and supported the generally accepted conclusion that it is hopeless to attempt to defend against a sophisticated and determined offense. Last week's testimony went on to indicate how, after this fact was generally accepted, the promoters of the ABM proposed the Sentinel system for the purpose of countering an attack by Chinese mis-

siles. Such an attack is supposed to consist of fewer and less sophisticated missiles and thus presents a simpler problem to solve. The problems created by decoys and other penetration aids are solved by defining them out of existence, and a cheaper area defense system becomes possible in theory. Serious consideration is also being given to a hard-point defense system in which the defense would intercept only those objects actually aiming at certain specific very small target areas such as those centered on hardened missile sites and command centers.

The problems of penetration aid devices and tactics are again absent by definition, and the resulting problem, in truth I believe, becomes even easier to solve theoretically than in the case of the hypothetical Chinese missile attack. It is important to note, though, that in this hard-point defense case, entirely different defense methods, which cannot be used to defend cities or large areas, also becomes feasible. Such approaches include mobility—as in Polaris and Poseidon—deployment of greater numbers of offensive missiles, and various deception devices and tactics such as providing more missile silo targets than there are missiles, and then playing a sort of shell game with the missile themselves. Thus, it is precisely in the case where an ABM-type defense becomes easiest that numbers of alternative technical defense schemes also become possible. Furthermore, and again because the problem as given is easier, it is quite safe to postpone any decision to deploy an ABM at least until after present attempts to get new arms control negotiations moving.

CAPABILITY OF DEFENSE SYSTEM DOUBTED

I should like now to turn to a technical problem that pertains to all the forms of ABM so far proposed, but which unfortunately is not so simple to discuss nor so easy to quantify as those brought to your attention last week.

Any active defense system such as the ABM must sit in readiness for 2 or 4 or 8 years and then fire at the precisely correct second following a warning time of only a few minutes. This warning time is so short that systems designers usually attempt to eliminate human decisionmakers, even at low command levels, from the decisionmaking system. Further, the precision needed for the firing time is so fine that machines must be used to choose the precise instant of firing no matter how the decision to fire is made. In the case of offensive missiles the situation is different in an essential way: Although maintaining readiness throughout a long, indefinite period is necessary, the moment of firing is not so precisely controlled in general and, hence human decisionmakers, including even those at high levels, can be permitted to play a part in the decisionmaking process. Thus, the trigger of any ABM, unlike the trigger of the ICBM's and Polarises, must be continuously sensitive and ready, in short a "hair trigger", for indefinitely long periods of time.

TEST RANGE AND REAL WORLD

On the other hand, it is obvious that we cannot afford to have an ABM fire by mistake or in response to a false alarm, and, indeed, the Army has recently gone to some pains to assure residents of areas near

proposed Sentinel sites, that it has imposed design requirements which will insure against the accidental launching of the missile and the subsequent detonation of the nuclear warhead it carries. These two requirements, a hair trigger so that it can cope with a surprise attack and a "stiff trigger" so that it will never go off accidentally are, I believe, contradictory requirements. This problem exists only in the real world and not on the test range; on the test range there need be no such concern about accidental misfires, the interceptions do not involve the use of nuclear weapons and the day, if not the second, of the mock attack is known.

Another essential—but again difficult to quantify—difference between the real world and the test range lies in the fact that the deployed defensive equipment will, normally, never have been fully exercised and even the supposedly identical test range equipment will never have been tested against the precise target or targets that the deployed equipment would ultimately have to face. In the case of other defense systems which do work after a fashion, practice using the actual deployed equipment against real targets has been possible and has been a major element in increasing their effectiveness. Thus, the Soviet SAMs [surface-to-air missiles] in North Vietnam works as well as they do because both the equipment designers and the operating crews have had plenty of opportunities to practice against U.S. targets equipped with real countermeasures and employing real tactics.

For these and similar reasons, as well as because of the technical problems detailed for you last week, I continued to have the gravest doubts as to the capability of any ABM system I have heard of, whether or not the problem has been defined into being "easy" and whether or not it "works" on a test range. I am not here talking about some percentage failure inherent in the mathematical distribution of its distances, nor statistically predictable failures in system components but, rather, about catastrophic failure in which at the moment of truth either nothing happens at all, or all interceptions fail.

RELATIONSHIP BETWEEN ABM AND ARMS CONTROL POLICIES

I should like now to turn from technical matters to political matters concerning the relationship between the ABM and arms control policies and possibilities. It is frequently said that the ABM, or at least some version of it, does not have serious arms control implications, the reasons advanced having to do with its intrinsically defensive character. In my opinion such a belief is based on an error which may be called the fallacy of the last move. It is indeed true, in some cases, that if the last move that was ever made in the arms race were that of deploying an ABM system, then deploying the ABM would by definition not have any arms race implications. But in the real world in which there currently is constant change in both the technology and the deployed numbers of all kinds of strategic systems, ABMs do have disarmament implications. In support of this notion, let me turn to a relevant bit of real recent history.

At the beginning of this decade, we began to hear about a possible Soviet ABM and we became concerned about its possible effects on our ICBM and Polaris systems. It was then that we began to consider seriously various penetration aid ideas among which was the notion of placing more than one warhead on a single offensive missile. This

original idea has since grown in complexity, as these things do, and has resulted in the MIRV concept (multiple independent reentry vehicles). There are now additional justifications for MIRV besides penetration, but that is how it all started. As others have pointed out, the MIRV concept is a very important element in the arms race, and potentially seriously destabilizing. In fact, the possibility of a Soviet MIRV is used as one of the main arguments in support of the idea of hard-point defense and thus we have come one full turn around the arms race spiral. But no one in 1960–61 thought through the potential destabilizing effects of multiple warheads and certainly no one did, or even could have, predicted that the inexorable logic of the arms race would carry us directly from Soviet talk in 1960 about defending Moscow against missiles, to a requirement for hard-point defense of offensive missile sites in the United States in 1969. Similarly no one today can outline in detail what kind of a chain reaction a Sentinel or a hard-point defense deployment would lead to. But we all know of the propensity of scientists and engineers to respond to technical challenge with further technical complexity and we have seen the willingness of both sides to pay for the supposed technical solutions at almost any cost.

EFFECT OF ABM DEPLOYMENT ON ARMS RACE

Thus, although I cannot be sure of the mechanism, I believe that either hard-point defense or Sentinel would produce further acceleration of the arms race. It is possible that the deployment of these ABMs would lead to a new round of penetration aid developments with further consequences of the magnitude of those produced by MIRV. It is indeed probable that deployment of these ABMs would lead to greater numbers of deployed offensive warheads on both sides. We may expect deployment of these ABMs would lead to the persistent query, "But how do you know it really works?" and the pressures now applied against the current partial test ban treaty would be multiplied. It is certain that deployment of these ABMs would lead to more steps in that awesome direction of placing greater reliance on automatic devices for making that ultimate decision as to whether or not doomsday had arrived.

It thus appears that as a specific part of a well thought out and well defined arms control agreement, deployment of hard-point defense might play a positive role, but otherwise it would be just one more step away from national security.

EFFECT ON NATIONAL SECURITY

Finally, perhaps the worst arms control implication of the ABM is the possibility that the people and the Congress would be deceived into believing that at long last we are on the track of a technical solution to the dilemma of the steady decrease in our national security which has accompanied the steady increase in our military power over the last two decades. Such a false hope is extremely dangerous if it diverts any of us from searching for a solution in the only place it may be found; in a political search for peace combined with arms control and disarmament measures.

SUMMARY

In summary, then,

1. Because of certain intrinsic disadvantages of the defense, and because of certain fundamental design problems, I doubt the capability of either the Sentinel system or the hard-point defense ABM to accomplish its task, whether or not it ultimately "works" on a test range.

2. I believe that the deployment of any ABM would in the long run almost always result in further acceleration of the arms race. An exception would be in the case of the deployment of an ABM as a carefully integrated part of a major move in the direction of arms control and disarmament.

3. One result of the arms race is that, as our military power increases, our national security decreases. I believe this basic situation would not be improved by deployment of any ABM.

4. Another result of the arms race is that, due to the ever-increasing complexity of both offensive and defensive systems, the power to make certain life and death decisions in inexorably passing from statesmen and politicians to more narrowly focused technicians, and from human beings to machines. An ABM deployment would speed up this process.

Thank you, Mr. Chairman.

Senator GORE. Doctor, yours is a most arresting statement. It is hard to refrain from questioning you, but if we start questioning you, we may not hear our other two equally distinguished witnesses.

Dr. Kistiakowsky?

(A biographic sketch of Dr. Kistiakowsky follows:)

BIOGRAPHIC SKETCH OF GEORGE BOGDEN KISTIAKOWSKY

Born: November 18, 1900, Kiev, Russia.

Education: Kiev public schools until 1918; University of Berlin, Ph. D., 1925; Harvard University, D. Sc., 1955; Williams College, 1958; Oxford, 1959; University of Penna., 1960; University of Rochester, Carnegie Tech., 1961; Princeton University, Case Institute of Technology, 1962.

Experience:

1926–28: International Research Fellow, Princeton.
1928–30: Research associate, Princeton.
1930–33: Assistant Professor of Chemistry, Harvard University.
1933–37: Associate Professor of Chemistry, Harvard University.
1937–59, 1961—: Professor of Chemistry, Harvard University.
1959–61: Special Assistant to the President for Science and Technology.
1961—: Chairman Science Board, Director of Itek Corporation.
1957–63: Director of the Cabot Corporation and Member of the President's Science Advisory Committee.

Awards include:

1946: Medal for Merit.
1948: British Medal for Service in the Cause of Freedom.
1958: Priestly award.

Memberships: Honorary Fellow of the Chemical Society (London); member of the Royal Society, National Academy of Sciences (Vice President, 1965–69), American Academy of Sciences; American Chemical Society, American Philosophical Society.

Research and Writing Activities: Contributor of numerous articles to scientific journals. Research in chemical kinetics; thermodynamics of organic molecules, shock and detonation waves; molecule spectroscopy.

Address: 12 Oxford Street, Cambridge, Massachusetts.

STATEMENT OF DR. GEORGE B. KISTIAKOWSKY, PROFESSOR OF CHEMISTRY, HARVARD UNIVERSITY

Dr. KISTIAKOWSKY. Mr. Chairman, and gentlemen, it gives me great pleasure to respond to your invitation to present to you my observations on the antiballistic missile systems and on the related issues of strategy and foreign policy of the United States.

During most of the 1950s, I was actively involved on an advisory level, with our long-range ballistic missile program and had little opportunity to acquaint myself in detail with the problems of defense against a ballistic missile attack. However, starting late in 1957 when I was appointed a member of the President's Science Advisory Committee and especially since mid-1959 when chosen by President Eisenhower as his Special Assistant for Science and Technology and elected Chairman of PSAC, problems of missile defense became part of my concerns. The PSAC then had several strong panels of experts carefully considering, from the technical point of view, various aspects of military technology. For instance, some of the conclusions of the panel chaired by Dr. J. B. Wiesner, later the Special Assistant for Science and Technology to President Kennedy, were that the installation of BMEWS (ballistic missile early warning radar system) was an urgent task, that our land-based missiles should be dispersed and be converted as soon as possible to hardened underground silos, and so forth.

These recommendations were based on the conviction that the strategic posture of the United States should not be one of hair-trigger response to a tactical warning of attack but of ability to withstand a first strike and still be in a position to retaliate with adequate force. This panel—and to a less intense degree the entire PSAC—studied in detail the Army's proposed ABM system which, I may note, was a logical sequel to Army's concern with anti-aircraft defenses (AA artillery and more recently the Nike-Ajax and Nike-Hercules AA missiles).

WEAKNESSES OF NIKE-ZEUS DEFENSE SYSTEM

In 1959–60 the Army representatives and the contractor's technical personnel in repeated meetings with us were very confident of the performance of the Nike-Zeus defense system, then in development and urged the immediate start of its deployment. Several alternate levels of deployment were being proposed to meet various objectives. The technical findings of PSAC, however, were not favorable to deployment. The system could have probably dealt effectively with a modest number of simple "first generation" offensive missiles but was likely to fail against a more sophisticated missile attack, which would employ various penetration aids, such as decoys, electronic blackout, and radar-jamming devices. A major weakness of the system was its low traffic-handling capacity, that is, its inability to deal simultaneously with numerous incoming reentry vehicles, because it relied on mechanically steered radar antennas. As I recall, our panel urged the development of electronically scanning antennas, the so-called phased array radars, which however were then regarded as not feasible by some

of our briefers. Of course, since then such radars have been fully developed.

Other points of weakness were, as I already noted, the sensitivity of Nike-Zeus to electronic blackout and its questionable ability to discriminate against even primitive decoys.

The panel was also concerned with the proposed Kwajalein Island tests of Nike-Zeus interceptor missiles, to which Dr. York just referred, using as targets the nose cone of souped-up IRBM Jupiter missiles launched from Johnson Island and the panel feared it would not be realistic enough. It urged the use for this purpose of ICBMs launched from the Vandenberg Air Force Base. These have been used in such tests since about 1962.

President Eisenhower's decision was to postpone the deployment and therefore he did not authorize the expenditure of the so-called preproduction funds which were appropriated by Congress for this purpose. Later President Kennedy decided against deployment of Nike-Zeus, but initiated the development of the present Nike X system.

It is interesting to contemplate that, had the deployment of Nike-Zeus been authorized in 1960–61, we would have just about now the full system in operational readiness, after spending what was then estimated as $20 billion and could have been, judging by analogy with other large weapon systems, twice as much. Considering the current numbers and sophistication of offensive missiles now being deployed by the super powers it is technically certain that the Nike-Zeus ABM system would now be of little value. It would be obsolescent or even obsolete, judging by the fact that the probably somewhat more modern Soviet ABM defenses around Moscow are rated of little value to the Soviet Union by our competent military experts.

NIKE X SYSTEM

For several years after 1961 my contacts with the ABM system development were rather superficial until late in 1966 when the former Secretary of Defense Mr. McNamara asked me to familiarize myself with Nike X and to form an opinion regarding the desirability of various levels of deployment of this system. As he stated in his San Francisco speech in the fall of 1967 and in his book "The Essence of Security" my conclusion was not favorable to the deployment of either the heavy anti-Soviet attack system or the light (Sentinel) anti-Chinese attack system.

A thinking man's first reaction to any proposal for a defense system against the almost unimaginable horrors of an attack with nuclear-armed ballistic missiles must inevitably be favorable. If lives can be saved, if we can preserve our society after a nuclear attack, expense does not matter and, besides, an effective defense system should give us a greater latitude in foreign policy. A detailed consideration leads me to conclude, however, that the proposed deployments of Nike X or its derivative Sentinel system are not likely to make major contributions to these objectives for a number of reasons and could actually be harmful to our national security.

The components used in Nike X and Sentinel systems, the radars, missiles, and computers, are much more advanced than were those of Nike-Zeus, but the new systems are extremely complex and the possibility of what Dr. Herbert York has just referred to as massive failure,

cannot be excluded for a system that must function the very first time it is tried out as a whole.

Nike X involves mammoth computers because in the few minutes that would pass between detection and intercept of incoming missiles no human command organization could decide upon and then manually execute the proper defense tactics. But computers, however fast they are in making decisions, must be instructed in advance by humans on what to decide upon in every situation that will confront them. Thus, however elegant the electronics, in the end one must trust that the computer programers will correctly anticipate all the future tactics that will be used against our defenses. They must write correct programs for discrimination between warheads and decoys, for instance, without knowing for sure what their characteristics will be. Having tried to use the Boston automatic telephone system after a great snowstorm a few weeks ago, I feel sensitive about the ability of complex automatic devices to overcome even the blind vagaries of nature, not to mention skilled human intellects of a potential enemy.

REASONS FOR TECHNICAL DOUBTS

Let me give you a few examples from the past to illustrate the reasons for my technical doubts.

Two highly competent and well-informed individuals, Drs. R. L. Garwin and H. A. Bethe, have described in some detail in the Scientific American magazine, volume 218, March 1968, several penetration aids that might be used at a comparatively low cost to the attacker. They conclude that the present type of ABM systems could easily fail in such an environment, and I understand that Dr. Bethe has presented the same points to your committee.

The anticipation of the future tactics of an enemy is an extremely difficult task. Perhaps obliquely this can be illustrated by the degree of surprise achieved in the Tet Vietcong offensive of a year ago or in the capture of the intelligence ship *Pueblo*.

We may also note that the difficulties in programing the computers of the SAGE [semi-automatic ground environment] antiaircraft defense system turned out to be so great that a separate large organization was eventually set up to do the programing.

Finally, the performance of complex military systems is frequently lower than promised by the contractors, even after modifications have been made upon field trials, as evidenced by the statistical data reported in an article of Bernard D. Nossiter, Washington Post, January 26, 1969. The F–111B aircraft is a specific recent example.

I am not asserting that all the indicated difficulties are certain to plague Nike X, but on the other hand it is difficult for me to conceive how decisions on foreign policy of the United States could be substantially influenced by the assertion that the deployed ABM system will perform under attack as well or better than promised. Thus the available range of foreign policy choices cannot be greatly influenced by the ABM deployment.

Several highly qualified individuals have concluded that a heavy deployment of Nike X cannot protect us—it cannot give us an impenetrable shield in Mr. McNamara's words—against a sophisticated large-scale missile attack. Of course some attrition of attacking missiles will be achieved and thus, if our potential enemy takes no steps to com-

pensate for the deployment of ABM, some damage and casualty reduction could be expected. But the assumption that such steps would not be taken appears highly improbable if the adversary is the Soviet Union which has the means to take them and will feel compelled to do so, to preserve its own secure deterrence posture.

In fact, overreaction, as judged by the past, would be the norm, particularly when the uncertainties about performance are as great as with the ABM systems. The probable responses include increases in the number of offensive missiles and the deployment of MIRVs with their destabilizing effect. The development of the latter, as you, of course, know, we ourselves decided to undertake upon learning of the start of the deployment of the Soviet ABM. These steps induce obvious counteractions by the other superpower and the net result could easily be another major expansion of offensive missile forces and an accompanying increased uncertainty about the security of our deterrent.

POLITICAL CONSEQUENCES OF AN ARMS RACE

The complex political consequences of such a heightened arms race are beyond me to evaluate quantitatively. One aspect of this is to what extent will there be an adverse effect of such an arms race on other nations, such as the almost certain adverse effect on the Nonproliferation Treaty.

The other is that in the period of an intense arms race the knowledge of the capabilities and intentions of unilateral action—even a preemptive strike, for instance—rise. Hence, the probability of nuclear war might increase. I doubt very much that the deployment of Nike X would compensate for this rising probability by a limitation of damage in the event of nuclear war.

The original Sentinel or thin anti-Chinese ABM deployment concept emphasized area, that is, population, defense by long range Spartan interceptors. It appears to me that this concept was somewhat changed by last fall, resulting in sites containing both Spartan and Sprint missiles which were to be deployed near our largest cities.

It seems reasonable to assert that an attack on the United States by a modest force of ICBMs which the Peoples Republic of China is likely to deploy sometime in the seventies is wholly and utterly irrational, since it would invite a retaliatory blow which would totally destroy China. If nonetheless the Chinese decide to attack, they would certainly be capable of adding some penetration aids to their ICBMs if, as assumed, they would have the technical and other resources to deploy a significant ICBM force. For an irrational action such as we are hypothesizing the certainty that penetration aids will succeed would not be required and hence the presence of Sentinel might not be a deterrent. The Chinese, of course, could also use other means than ICBMs for an irrational nuclear attack in which case Sentinel might be of no use. Thus the basing of the U.S. policies on the assumption that Sentinel would prevent large American casualties in the case of a Chinese attack in the seventies would not be very prudent. On the other hand, the deployment of the Sentinel, especially in the mode begun last fall, foreshortens greatly the leadtime for a conversion of it to a heavy ABM deployment.

This foreshortening the Soviet military planners would have to take into account and thus the likelihood of an allout missile race between the superpowers might increase.

DEFENSE OF MISSILE SITES

Another form of ABM deployment has contemplated the exclusive defense of our hardened missile sites. Under proper circumstances such a move would not be inviting an arms race and could in fact stabilize mutual deterrence by protecting the retaliatory force against a preemptive strike. It is highly doubtful, however, considering the present threat, whether such deployment need be started immediately. Furthermore, the Sentinel system is overdesigned, I should perhaps say misdesigned, for this application, since the intercept of incoming warheads could take place much nearer to hardened Minutemen silos than to cities and the probability of kill of the incoming warheads could be relaxed. Thus, for instance, an interceptor of shorter range and less acceleration than the Sprint might be largely employed and other simplifying changes made. To avoid the dangers of the arms race that I have already discussed, the defense of missile sites must be unambiguously designed just for this purpose.

Having followed the development of weapon systems over the past quarter of a century, I cannot remain unaware of the very substantial momentum that a technological development of the magnitude of our ABM creates. I am, therefore, concerned that even a limited deployment, as I just mentioned, would be open ended and, with assembly lines operating, could lead to a continuously expanding system, which would obviously be a stimulus to a heightened arms race.

ARMS CONTROL AGREEMENTS

My presentation thus far made no mention of arms control agreements but not because I am opposed to them. I welcome unreservedly President Nixon's announced intention to engage soon the Soviet Union in discussions and negotiations on the limitations of offensive and defensive strategic weapons. It is only a cessation of the arms race that could in the long run decrease the threat of nuclear war and thus, in a real sense, increase our national security.

I recognize that agreements on arms control measures will undoubtedly take much time and will not be easy to achieve. In the meantime, it seems to me, it would be to everybody's great advantage to avoid commitments which could result in the acceleration of the arms race. This includes deployments of ABM systems, even though the eventually agreed upon strategic arms might comprise modest ABM defenses as a protection against attacks by third parties. In fact, however, the verification of the extent of ABM defenses might present such difficulties that prudence would call for their abandonment.

In conclusion, Mr. Chairman, may I express the hope that these general remarks, which I would be glad to elaborate if asked to do so, will be of some small use to your committee.

Thank you very much.

Senator GORE. Doctor, your statement, too, is extremely challenging.

The committee will now hear Dr. James Killian, presently chairman of the board of the Massachusetts Institute of Technology.

(A biographic sketch of Dr. Killian follows:)

BIOGRAPHIC SKETCH OF JAMES R. KILLIAN, JR.

Born: July 24, 1904, Blacksburg, S.C.

Education: Student Trinity College (Duke University), 1921–23; B.S. Mass. Institute of Tech, 1926; hon. ScD., Middlebury College, 1945; LL.D. (hon.), Union College, 1947, Bowdoin College, Northeastern U. and Duke, 1949, Boston U. and Harvard, 1950, Williams College, Lehigh U., U. of Penna., 1951, Univ. of Chattanooga, 1954. Tufts Univ., 1955. Univ. of California and Amherst College, 1956, College of William and Mary, 1957, Brandeis Univ., 1958, Johns Hopkins, NYU, 1959, Providence College, Temple Univ., 1960. U. of S.C., 1961, and Meadville Theological School, 1962; Sc.D., Bates College, 1950, University of Havana, Cuba, 1953, Notre Dame Univ., 1954, Lowell Tech. Institute, 1954, Columbia, College Wooster, Oberlin College, 1958, U. Akron, 1959, Worcester Polytechnic Institute, 1960, Univ. of Maine, 1963; D. Applied Sci., U. Montreal, 1958; D. Eng., Drexel Institute of Technology, 1948, Univ. of Illinois, 1960, Univ. of Mass., 1961; Ed.D (hon.), Rhode Island College, 1962; H.H.D., Rollins College, 1964.

Experience:

1926–27: Assistant managing editor of *The Technology Review*

1927–30: Managing editor of above.

1930–39: Editor of above.

1939–43: Executive assistant to the president, Massachusetts Institute of Technology.

1943–45: Executive vice-president.

1945–48: Vice-president; President (1948–1959).

1959——: Chairman of the corporation.

1957–59: Special assistant to the President of the U.S. for Science and Technology.

1957–59: Chairman of the President's Science Advisory Committee.

1957–61: Member of above.

1961——: Consultant.

1965–67: Director, American Telephone and Telegraph Co., Cabot Corp., Polaroid Corp., General Motors Corp.; Chairman, Carnegie Commission of Educational Television.

1950–52: Member, President's Advisory Committee on Management.

1956–58: Chairman, President's Board of Consultants on Foreign Intelligence Activities.

1961–63: Member, Advisory Council on State Departments of Education, U.S. Office of Education; Chairman, President's Foreign Intelligence Advisory Board.

Among other positions:

1950–51: Member of the President's Communication Policy Board.

1951–57: Member, Science Advisory Committee, Office of Defense Mobilization.

1951–56: Chairman, Army Science Advisory Panel.

1956–57: Trustee, Institute of Defense Analyses (Chairman).

1959–61: Trustee, same as above.

Awards include:

1948: President's Certificate of Merit.

1953: Certificate of Appreciation, Dept. of Army.

1957: Exceptional Civilian Service Award, Dept. of Army, Public Welfare Medal, National Academy of Science.

1957: Decorated Croix d'officer, Legion of Honor (France).

1963: Hoover Medal.

Memberships: Fellow, American Academy of Arts and Sciences; member, National Academy of Engineering, American Society of Engineering and Education (hon.), Sigma Chi, Phi Beta Kappa, Tau Beta Pi.

Address: c/o M.I.T., Cambridge, Massachusetts.

STATEMENT OF DR. JAMES R. KILLIAN, JR., CHAIRMAN OF THE BOARD, MASSACHUSETTS INSTITUTE OF TECHNOLOGY

Dr. KILLIAN. Senator Gore and members of the committee, I, too, am glad to accept your invitation to present my personal views this morning, but I must hasten to disclaim any specialized competence for commenting on current proposals for the deployment of the Sentinel system. In January 1967 I was invited along with Dr. Kistiakowsky, Dr. York, and others by Secretary McNamara to give my reaction to proposals then under consideration for deployment of an ABM system. Not since then have I had occasion to bring myself up to date on the technological, intelligence, costs, and international factors which, in my judgment, must be carefully weighed together if one is to reach worthwhile, responsible conclusions on the deployment of an ABM system. In the past 2 years my extracurricular time and energy have been largely devoted to local urban problems and to innovation, as mentioned by Senator Kennedy.

ABM DEPLOYMENT NOT URGED

At the 1967 meeting called by Mr. McNamara, I expressed grave reservations about the desirability of deploying an ABM system under conditions obtained at that time. I felt that deployment should be deferred in the hope that escalation could be avoided, the kind of escalation that Dr. Kistiakowsky has been talking about. But I also expressed the hope that research, development, and testing should continue. I tend to hold those same views today, but for reasons I have given, my views are not buttressed by an adequate study of the issues which now confront us.

For almost 20 years, beginning in 1950, I devoted from time to time major energies to mobilizing advice on problems of national defense, and this experience has left me with a continuing sense of the inescapable requirements and urgencies involved in preserving our national security; we cannot relax our vigilance in maintaining a stable deterrent to nuclear war. At the same time, this long experience also has given me a growing awareness of the importance to national security of sustained efforts to seek a curtailment of the strategic arms race. My views toward the ABM have been conditioned by the priority I give to moderating, if at all possible, an action-reaction escalation of the arms race. I fear that substantial ABM deployment either by the Soviet Union or ourselves could result in escalation and could well fail, in our own case, to provide us with any additional security. In reaching the conclusion I did 2 years ago, I was also troubled by the possibility that the cost of an ABM system could increase faster than the cost of strengthening the offense. I still feel that the maintenance of a credible deterrent offensive capability is better insurance against a first strike by an adversary than an ABM shield. Above all, I have felt the importance of restraining the strategic arms race as an essential objective in avoiding the ultimate catastrophe of a nuclear war which could imperil the survival of all civilized societies.

TOTAL CONTEXT OF STRATEGIC SYSTEMS

I find it difficult, I must say, to appraise the ABM without viewing it in the total context of all our offensive-defensive strategic forces. It is troubling to me that this systems view is so largely neglected in the current public debate about the ABM. I think we ought to be paying more attention to some of the alternatives, the hardening, the superhardening of our Minuteman missiles, and various other possibilities, and I think we ought to be looking at all of the effects of a strategic system both offensive and defensive and place the ABM in that context.

I salute this committee for its efforts to illuminate the complex issues surrounding the ABM and to provide a forum for balanced, objective views.

In my invitation to come here before the committee, I was encouraged to comment on the urgent need today better to mobilize and draw upon the professional knowledge of our country in aiding the publicly accountable officers of Government, both in the legislative and executive branches, to secure the assessments and analyses they need in judging intricate, arcane technological developments, such as the ABM, which are interwined with policy and strategic questions. Because of the growing impact of technology on policymaking, we need better methods of assessment, technical assessment, in order to assure that technology will be used beneficially to enhance our security and to improve the quality and tranquility of our society.

AD HOC COMMISSION TO STUDY STRATEGIC WEAPONS TECHNOLOGY

Let me first make a specific proposal prompted by the current Sentinel debate. In considering the strategic options available to us in the years ahead, it seems essential that we plan not by single systems, such as the Sentinel, one at a time, but for the strategic system as a whole as I have already emphasized. This and other considerations lead me to suggest that an ad hoc commission or task force be appointed to make an independent, comprehensive study in depth of our strategic weapons technology and of the factors which bear upon the decisions the Nation must make regarding ongoing strategic forces and policies.

For several months I have become increasingly convinced, as I have observed the national debate, that such a task force is urgently needed. The commission that I have in mind should be made up of members who would devote full time over a period of several months to the study. The task force should be independent of the Department of Defense and other Government agencies which have a direct responsibility for formulating, advocating, and carrying out strategic programs. In its studies it should seek to gain an understanding of all of the relationships of all of our weapons systems and of the strategic options confronting this country in the years immediately ahead.

RECOMMENDATION IN COMPETITION WITH GOVERNMENT ANALYSES

I do not propose that the findings of such a commission should necessarily carry more weight than studies conducted within Government. I have great respect for the thoroughness and rigor which the Government can bring to the formulation of policy decisions. Independent studies might well serve to sharpen the Government's own

analyses. The task force's recommendations should be critically examined by the normal procedures of the Government and considered in relation—in competition—with proposals which have come from the Department of Defense. The special value of these studies would be that they would be independent, that the task force could reach independent conclusions on the part of a group of competent citizens who were free of organizational loyalties and who could therefore formulate their evaluations and recommendations without being constrained by any departmental commitments or biases. So often it has seemed to me as I have watched the defense process in this country, the roles and missions interests of the armed services influence defense decisions more than they should, and the task force I suggest could transcend these service interests. By virtue of its freedom from any vested interests, such a commission might also provide some reassurance—and I attach growing importance to this—to the growing number of citizens in this country who are concerned about the military-industrial complex and its alleged influence on our strategic policies and programs.

In 1954, I chaired a large-scale study partaking of some of these characteristics of this task force I suggest, this effort undertaken at the request of President Eisenhower, and I think it fair to say that intensive and comprehensive study which resulted helped in reaching priority judgments about our weapons technology and related matters, and was ultimately viewed as helpful by the Government agencies involved, including the Department of Defense.

BENEFITS FROM INDEPENDENT ASSESSMENTS

In playing its fundamental role in reaching decisions about these weapons systems, which require vast expenditures and which might have a fateful effect on our survival, Congress, I respectfully suggest, can benefit from such independent assessments. Essential as it is, I am not sure that the conventional hearing is by itself sufficient to provide Congress with the searching studies it needs to cope with the complexities of great and arcane security issues such as that presented by Sentinel. Is it not possible that Congress, too, could benefit from creating a variety of special task forces to make studies in depth for its cognizant committees? It has been heartening to note the growing practice of some congressional committees, including this one, to contract for special studies and to engage consultants who can do more than simply appear for brief testimony. I think the public would also benefit from the availability of such studies.

Some years back Dr. James B. Conant made a proposal that I do not believe has ever been tried in a formal way. He advocated that in the consideration of weapons of technical complexity and great cost, there be a quasijudicial review of proposals, including a form of adversary proceeding. "When a question comes up to be settled," he suggested, "one or more referees might hear the arguments pro and con. If there were no contrary arguments, some technical experts should be appointed to speak on behalf of the taxpayer against the proposed research and development. Then adequate briefs of the two or more sides should be prepared (not a compromise committee report)." Conant went on to emphasize that today every citizen is a "party to an enormous new enterprise. His government has gone into the re-

search and development business on a scale totally different from anything seen in the past * * *. Consequences of tremendous significance in terms of survival may hang on the way this work is carried on," and "the waste of enormous sums of money could threaten the soundness of our economy." I think that was a prophetic comment.

NECESSITY OF HEARING CONTENDING POINTS OF VIEW

It is important for the policymaker and the public to have the benefit of listening to contending points of view on complex technical and strategic proposals such as Sentinel and also for them to recognize that many questions involving both technical and policy issues cannot be answered with positive yes or no certainty. There are many such questions to which scientists of equivalent competence, objectivity, and complete integrity will respond differently. Therefore, I cannot fault those experts who favor an ABM deployment, and they, too, need to have full opportunities to be heard.

In conclusion, let me reemphasize that along with the executive branch, Congress is faced with a grave and fateful array of decisions about our nuclear strategic forces and policies confronting them. The fate of the whole world is involved. Congress will need to combine with its own great resources of informed judgment the best wisdom available in the Nation. As it grapples with these issues, it also has the opportunity along the way to inform the public and make available to the public the objective and searching assessments it sponsors. In the belief that these hearings are for that purpose, I count it a privilege to be here.

Thank you very much.

Senator GORE. Gentlemen, the statement of any of you would have justified this hearing. Your logic, your intellectual eloquence, excellence, makes me feel extremely proud to be an American.

Senator Fulbright.

Senator FULBRIGHT. Mr. Chairman, I would like to associate myself with that comment. All of these gentlemen have given extraordinarily perceptive statements, which lead me to my first question.

INDEPENDENT VIEWS NOT SOUGHT BY CONGRESSIONAL COMMITTEES

Have any one of you three been invited by the Committee on Armed Services of the House to testify on this subject?

Dr. KISTIAKOWSKY. No.

Dr. KILLIAN. No.

Dr. YORK. No.

Senator FULBRIGHT. By the Committee on Appropriations of the House?

Dr. KILLIAN. No.

Dr. KISTIAKOWSKY. No.

Dr. YORK. No.

Senator FULBRIGHT. By either of those committees in the Senate?

Dr. KISTIAKOWSKY. No.

Senator FULBRIGHT. Is it not extraordinary that your views about this matter, which has been so controversial, have never been sought by the responsible committees of the Congress?

Dr. Killian, I will address it to you. You propose in your very perceptive statement that we have a sort of advisory commission on these matters. You have had a good deal of acquaintance with the Congress.

Has it been your impression that the committees which authorize these programs have sought at any time, not just recently, such outside, independent views about matters of this kind?

Dr. KILLIAN. I am not experienced enough to really answer this question with confidence, but I would hasten to say that Congress should avail itself more than it has of this kind of advice.

Senator FULBRIGHT. It has been my impression when one seeks to inquire about matters of this kind that we are met with the allegation that this is a highly classified matter and is unfit for public discussion or by Members of Congress.

Dr. KILLIAN. I would hasten to say that I think the ABM problem, and an array of strategic problems, can be discussed adequately without getting into very arcane, classified material. But I would also hasten to emphasize that it ought to be possible under controlled circumstances to examine or have people, in whom you have confidence, examine the classified material.

Senator FULBRIGHT. Dr. Killian, I could not agree with you more. I think you are quite right. I am trying to highlight the problem with which we have been confronted in dealing in any way with the military appropriations. These vast appropriations, in some cases in the neighborhood of $30, $40, $50, $60 billion, at once are often disposed of in a half hour or 2 hours on the floor. We are given the feeling if you question these amounts first, you are dealing with classified material, and next, you are unpatriotic to assume that there could be any question about the wisdom of the Pentagon.

That may be a slight overstatement, but I would say that there has been a minimum of discussion of any of these major programs in public, to my knowledge, and this subcommittee, led by Senator Gore, is almost a unique experience. Due to the ominous character of our present situation, he has been inspired and you have responded, to discuss these matters in a different forum.

DIFFICULTY TO GET PUBLIC DISCUSSION OF THESE MATTERS

Now, last year I think it was in a discussion of the ABM matter, a number of Members of the Senate, led by the Senator from Kentucky primarily, but with others joining in, attempted to delay the proceeding with this system.

I asked the chairman of the Armed Services Committee if any independent scientist, such as you three gentlemen, had been requested to appear before the Armed Services Committee, the authorizing committee, and if my memory serves me correctly, he said "No." The only witnesses had been people who are in the Government.

So I say this by way of background, that I appreciate very much what you say about independent advice. I only highlight that this is not an easy matter to deal with in the Congress. The traditions are all to the contrary, and those of us, including the chairman of this subcommittee and others, have had difficulty in doing what you are suggesting; that is, have a real public discussion of some of these matters.

I say that because your statement about it, which I thoroughly approve of, inspired it. It is going to be a major program to get public discussion of this and other matters.

All of these statements were so good it is hard to know where to start, but I will ask just a few questions.

POSTPONEMENT OF NIKE-ZEUS DEPLOYMENT

One thing that caught my attention, Dr. Kistiakowsky, was when you said that the Congress had authorized funds for Nike-Zeus, and the President held them up.

Were you a part of the reason they were held up?

Dr. KISTIAKOWSKY. As I recall what Congress—it is now 10 years ago and an old man's memory fails occasionally.

But, as I recall, what Congress authorized was the so-called preproduction funds, because the design of Nike-Zeus required that components be produced in very large quantities. There was no adequate industry for the purpose, so the desire was to build factories, and so on, and it is these funds which President Eisenhower did not authorize to be spent, thereby effectively postponing the deployment of Nike-Zeus.

Senator FULBRIGHT. And thereby, as you estimate, saving the country at least $20 billion, would you say?

Dr. KISTIAKOWSKY. That would be a very conservative estimate.

Senator FULBRIGHT. Very conservative. So again, Mr. Eisenhower deserves great credit for that decision.

Dr. KISTIAKOWSKY. I believe so. He is a great man whom I admire enormously.

Senator FULBRIGHT. It is too bad we do not learn more from such decisions today. Maybe we have, I do not know.

EFFECT ON NATIONAL SECURITY

Later you say that the deployment of Nike X or the Sentinel system could actually be harmful to our national security. Instead of being an addition to it, it is harmful. Did I understand you correctly?

Dr. KISTIAKOWSKY. Yes, sir; you understood me quite correctly.

I think it is a very serious possibility, and the reasons for that, as I have discussed in my, of course, very condensed statement, are possibilities for an accelerated arms race, with the consequent loss of secure deterrent which we have now.

Furthermore, and I think this should not be disregarded, is the commitment of the ever-increasing funds which such an arms race would entail and with it the terrible harm to our society at home, and the dangers of further militarization of our society. All of these factors, I think, are of great importance and by no means idle speculation.

Senator FULBRIGHT. This was a point on which I thought you were all in general agreement. I believe, Dr. York, you also said that to deploy this system would jeopardize our security rather than improve it; did you not?

Dr. YORK. Yes, and for the same basic reasons.

Senator FULBRIGHT. Yes.

Dr. YORK. That it is an element in heating up the arms race; that it, in fact, it may mislead people into thinking they are safer than they are and, therefore, making riskier decisions.

Senator FULBRIGHT. I thought it was very clear that both of you said it.

Do you agree, Dr. Killian, with that same conclusion? You did not make it quite as clear, but you agree?

Dr. KILLIAN. I tried to make it clear.

UNANIMITY AGAINST DEPLOYMENT

Senator FULBRIGHT. Is it fair to say that all three of you agree on that point?

Dr. KILLIAN. The action is conditioned by fear of escalation.

Senator FULBRIGHT. All three of you, three of the most eminent scientists, then, agree that to deploy this system would jeopardize our security at the present time; is that correct?

Dr. YORK. It is a step in the wrong direction.

Dr. KISTIAKOWSKY. Yes.

Senator FULBRIGHT. It is remarkable that there is this unanimity of view of men of your stature, and yet we are faced with the possibility that even today or tomorrow a decision may be made to deploy it. It is a rather remarkable situation.

I do not believe that they will make that decision. I cannot bring myself to believe it, but anyway it could happen. It is a possibility.

MEETING AT THE WHITE HOUSE

Senator CASE. Mr. Chairman, I wonder if I might just ask the Senator to yield at this point?

Senator FULBRIGHT. Certainly.

Senator CASE. Because it has occurred to me this is a most extraordinary opportunity for this committee to promote the discussion by these three men with Dr. Kissinger and, possibly, with the President of the United States today, and I am sure you and the chairman of the subcommittee, I know that all of us on our side, would join in urging this and making the necessary arrangements.

I wonder if we might not affirmatively do this and not just speak through the press or somebody else?

Senator FULBRIGHT. I certainly would like to do that, and I think it would be much more appropriate for you or the Republicans to do it than for a Democratic Senator. I would back it up no end, but it would be presumptuous if I initiated it.

Senator CASE. Then I will.

Senator FULBRIGHT. I do happen by coincidence to be going to a reception at the White House this evening. I will take occasion to suggest it.

Senator CASE. I hope it will be done even before that time.

Senator FULBRIGHT. I would hope they would know about this before that time.

I think it is really remarkable to me that this kind of a program could have gotten as far along as it has without a discussion such as you gentlemen have presented this morning, without having been made

public and in a proper forum. This forum, while it is proper today, should have appropriately originally occurred in the Armed Services Committee or the Appropriations Committee where the decision to deploy was made.

ANTICIPATED LOSS OF NATIONAL SECURITY

I do not want to take too much time, but I noticed one or two small things. I think you omitted the sentence by inadvertence, Dr. Kistiakowsky. You have a sentence I like very much. You wrote in your written statement but you did not read it, "Intuitively I anticipate a loss for our national security."

I mention it by way of emphasising what we have already said.

Dr. KISTIAKOWSKY. Senator, it is a mistake of my secretary.

Senator FULBRIGHT. It is all right.

Dr. KISTIAKOWSKY. She typed a second copy and omitted that sentence from my prepared text where I speak about the consequence of the arms race and I did not catch it. I apologize.

Senator FULBRIGHT. You did not intentionally leave it out.

Dr. KISTIAKOWSKY. I certainly would have said it because I believe it.

OPEN-ENDNESS OF A LIMITED DEPLOYMENT

Senator FULBRIGHT. One last question—there are many questions—but you stated, "* * * I cannot remain unaware of the very substantial momentum that a technological development of the magnitude of our ABM creates. I am therefore concerned that even a limited deployment would be open ended and, with assembly lines operating, * * *"

It is a very perceptive statement, and this is a good illustration of it. We have as an illustration the TFX which had this same kind of momentum which led to a tragic mistake and apparently a complete waste of $5 or $6 billion. This could be another illustration, and I think you have put it very well, that again we have to engage in what I would think is a procedure similar to that described by Dr. Killian to prevent this kind of mistake recurring.

MISSPENT FUNDS ON WEAPONS SYSTEMS

Which of you gentlemen referred to the Nossiter article?

Dr. KISTIAKOWSKY. I did.

Senator FULBRIGHT. Which was tremendous. That article indicated $40 billion had been misspent on weapons systems, did it not?

Dr. KISTIAKOWSKY. Yes, sir. Well, misspent or spent on things which did not perform as well as planned.

Senator FULBRIGHT. They were not all complete failures. Some were and others in a lesser degree; is that correct?

Dr. KISTIAKOWSKY. That is about it.

Senator FULBRIGHT. So I think that what you are proposing, and particularly Dr. Killian's proposal of a commission, could perhaps avoid that.

Most of the questioning under our system takes place after the horse is out, and not before, as you well know.

Thank you, Mr. Chairman.

Senator GORE. I would like to pose one question for the panel and then yield to Senator Case.

HAIR-TRIGGER COMPUTER RESPONSE

Dr. York, you have given me an uneasy feeling when you described the dependence of our national security and the execution of moves so vital in foreign policy, indeed, as peace and war, upon a hair-trigger computer rather than a decision by some chosen official.

Those of us who have had even limited experience in programing business needs into a computer system have only to find that some small but entirely unexpected variation from the pattern throws the whole computer report out of kilter.

Now, you have stated your position. I wonder if the other two distinguished panelists would comment upon Dr. York's description of the danger of the hair-trigger computer response.

Dr. KISTIAKOWSKY. I think, sir, that it is a very perceptive observation, and as one aspect of it I would like to bring out a point which may not have been considered as yet. That is the contention that such a system, let us say, Sentinel, will protect us against so-called accident.

Somebody launches a missile X thousand miles away by accident, and the Sentinel will save us. But if one then begins to analyze the problems of command and control, you see, one has to have this hair-trigger response all the intervening years to respond to something that is a blip on a radar screen and is then interpreted by a computer as an incoming object which threatens our country.

Thereupon, the launching of the antimissile has to take place in a matter of seconds, and certainly very, very few minutes.

PRESIDENTIAL DECISION IMPOSSIBLE

So that to give the President a real chance to decide whether a megaton warhead is launched into space, armed, is impossible. The decision has to be done either completely automatically by the computer or it has to be made by a comparatively very junior officer on duty.

Now, suppose that this radar blip continues approaching and does follow the trajectory that appears to be one of a nuclear missile, but is actually not a warhead. In that case, let us say, a Spartan missile would explode X miles above.

Now, surely that is high enough so that there would be no blast damage. But, for instance, many, many people, and that means Americans, would be blinded who happened to look up in that general direction at that moment. This sort of thing will depend on a decision which either has been made years ahead by computer programers or by a junior officer on duty at the instant of the event happening.

Senator GORE. At what distances would people be blinded who witness such and explosion?

Dr. KISTIAKOWSKY. I am afraid we are getting here into somewhat classified subjects; in other words, how big is the warhead. But it has been stated that it is in excess of a megaton, and therefore I would certainly say that people essentially below the point of explosion, which may be 200 miles away from the launching site or so, would be blinded if they happened to look up, of course and the weather was clear.

HOW CAN A MECHANIZED COMPUTER DISCRIMINATE?

Senator GORE. How can a mechanized computer discriminate between a decoy and some accidental object in the trajectory pattern, and to what extent can a computer exercise sophisticated discrimination in this regard?

Dr. KISTIAKOWSKY. Sir, a computer, if I may be bold enough, is really a very stupid thing. It is the programer who must be clever. The programer tells the computer how and what to decide upon receipt of certain information.

This information would come from radars, and to give you a very simple and unclassified example, if one has some very light unsubstantial decoy, as soon as the decoy enters even the highest levels of the atmosphere, that is, 60, 70, 80 miles above us, the decoy would be slowed down by the atmosphere much more than the heavy warhead, weighing thousands of pounds, let us say, and designed to move fast through the atmosphere.

Now, the radar would see both, and the computer would be told that an object which slows down very rapidly in the atmosphere, that is which appears to the radar still being far away at a certain time after the first observation, because it is moving now slower, that that object is harmless, so forget it, it is that kind of thing that is involved.

Senator GORE. Now, this programing which you describe would have to be completed and in the computerized system before it was deployed.

Dr. KISTIAKOWSKY. Before it was used.

Senator GORE. Before it was used.

Dr. KISTIAKOWSKY. Before it was used. But such programing would undoubtedly be a continuous operation, being more refined, more sophisticated as time goes on.

The programs fed into the computer in form of tapes and other memory, so-called memory, devices would be changed with time, as they have been, of course, changed repeatedly in case of SAGE, the semiautomatic air defense system that has been deployed.

TIMING OF COMMAND FUNCTION

Senator GORE. As you describe it, the command function would then be performed not at the time of the threatening missile or decoy but by the programer who prepared the program of the computer some time prior to that.

Dr. KISTIAKOWSKY. To a large extent, sir, that is right.

Of course, there is no doubt that the human commander would retain the opportunity for overriding the computers, and not to have that is unthinkable.

Senator GORE. Then that command function would either be by the programing authority for the computer or by some ranking officer who, at the moment, might turn off the computer and exercise his own judgment.

Dr. KISTIAKOWSKY. That is about it. It is the consequence of the extraordinarily short time that may pass between the determination of the trajectory of an object and the decision to fire.

You undoubtedly know that there are thousands of pieces of so-called space junk in space, the debris from the old satellites and such, like the

launching vehicles, and so on that, of course, are constantly going around. So that radars looking in space are not going to see just the heavens and the stars, if they could do that. They will be seeing just that junk, and lots of it, and so constantly the computers must discriminate between that junk and something new, unexpected; and what is even more important, not on a satellite orbit, but headed for impact, let us say, within the United States.

Once that determination has been made by the computer, and in order to do that it has to receive several signals from radar, giving consecutive positions of the object in space, to compute the trajectory. Then, of course, the decision to launch must be reached, and it is at that point, presumably, that the overriding function of the humans would come to the fore.

Senator GORE. Dr. Killian.

DISPERSAL OF AUTHORITY IN DECISIONMAKING

Dr. KILLIAN. I would just want to stress my own concern about the dispersal of authority that goes into such a system of this sort that comes out of this discussion.

In other words, it may be necessary for decisions even made by humans to have to be dispersed, and this gives me real pause.

Senator GORE. Dr. York.

Dr. YORK. May I comment on this once more?

I would like to reemphasize the point that this particular problem we have been discussing these last few moments becomes most serious in connection with the ABM.

It is one of the factors that makes the ABM a more serious element in the arms race rather than a less serious element.

This matter of requiring that the decision be made so fast that there is no room for a human being is specifically a requirement of the ABM and not of the offensive missiles. Sometimes the offensive missiles are imagined as being used in a strategic mode that requires an automatic decision, but that is only one option; whereas in the case of the ABM, the only option is to allow machines to make the decision.

Now, Dr. Kistiakowsky has said it would be unthinkable not to have a man in the system. I agree it ought to be unthinkable, but unfortunately it is not. That is exactly the direction we are headed in. We are not talking about the design of the ultimate weapon, but the ultimate absurdity. The machines are getting so as to complexities and time scales to where there is not any room for a human being if we keep on going the way we are going.

WITNESSES' STATEMENTS SENT TO THE WHITE HOUSE

Senator GORE. In line with Senator Case's suggestion, which I applaud, I have had hand-delivered copies of each of these statements of you gentlemen to the White House for I hope, President Nixon's attention.

Senator Case.

Senator CASE. Thank you, Mr. Chairman.

I am very glad indeed you have done that. I hope before we are through we may have the possibility of an actual meeting.

As the Chairman knows, I have been deeply concerned about this for many, many months. Last May I suggested these very hearings, and the subcommittee chairman most sympathetically received my suggestion but decided it was not possible at that time because of other demands upon the committee's attention. I am terribly glad we are having them now because I think they are still in time. You have done such a complete job in presenting the situation and in reassuring us that our concerns expressed many times are well-founded, that I have hardly anything to add except one or two matters for emphasis.

I hope one of the things that is discussed, if you are able to see the people in the White House or even the President today, will be Dr. Killian's suggestion for a systems study. It is essential, it seems to me, that this be done, and from time to time on an ad hoc basis, as you have suggested.

AFFIRMATIVE REASONS FOR ABM DEPLOYMENT

I wish that, for the enlightenment of the members of this committee, for our preparation for dealing with the matter on the floor, and, most of all, for the benefit of the American public, you would yourselves take the position of the devil's advocate and explain, in the face of what seems to us to be such an overwhelming array of objections to the deployment of this system now, how in heaven's name it has been possible for anyone to consider that it be deployed.

How, for example, Mr. McNamara was able, at the conclusion of that remarkable speech in 1967 against the whole business, to conclude nevertheless that a light system should be deployed. Why is the matter up again now when the array of objections is so overwhelming? Can you not prepare us for meeting these objections or these affirmative arguments?

Dr. YORK. It is obviously going to be difficult for me to answer that question as to why it would be a good thing to do because I do not think it is.

On the other hand, I guess all of us can try to recollect what the arguments in favor are. There are many of them—well, first of all, there is the one that says, "After all, how can you be against this because at worst all it costs is money and, at the best, it will save tens of millions of lives." That is a statement which is often made.

It is not strictly a technical statement, but it is a statement I have heard off and on ever since I have been involved back in 1958. The proponents ask: "How can you put the budget ahead of survival?"

That is how it was posed in the arms race days, in the missile gap days—"How can you put the budget ahead of survival?"

FALLACY OF THE LAST MOVE

The rebuttal has been made by each of us in different ways. Dr. Killian spoke of it in connection with the need for a systems approach. It is not correct just to say what an ABM would do without considering anything else.

Dr. Kistiakowsky and I both talked about the inevitable next move. I spoke of the fallacy of the last move.

The statement that all it can do at worst is cost money and at best it can save tens of millions of lives—and how can you be against that—is based on the fallacy of the last move. It assumes that nothing else will ever happen as well as assuming that everything works perfectly.

In fact, if one does take into account the subsequent moves, the situation becomes the reverse. At the very best, you stay even because the offense always reacts to the defense. So at best you stay even.

If the equipment works anything less than perfectly, you are worse off than you were before.

The time scale of defense is so long, even longer than offense—and heaven knows the time scales of these major offensive moves are quite long—that although the offense planners may be reacting after the fact of an ABM, the offense actually gets there first.

I mentioned the case in our own situation where we began to hear about the possibility of an ABM around Moscow in 1960, and we reacted in a way that produced the MIRV.

We still know that the question of what the Russians are doing around Moscow is not entirely resolved, but it does not seem to have been much of a system, and it is not going to work very well, but as a result of merely hearing about it in 1960, there are now these MIRVs which have greatly increased the threat to the Soviet Union and, of course, the same thing happens in reverse.

Dr. KILLIAN. That is an example of this action-reaction escalation.

Senator CASE. The point is we agree with this; we understand the fallacy of the last move.

Dr. YORK. But that is a rebuttal. But people keep saying, "How can you be against it, all it costs is money, and it might save tens of millions of lives."

Senator CASE. I cannot imagine that a man like Mr. McNamara, who was equally aware of the fallacy of the last move—what was his answer to that?

Dr. YORK. His answer to that was the Sentinel system designed to defend against the Chinese.

Of course, I think it is clear, it was not his answer, it was an answer that somehow he was—somehow he was forced to accept, I mean, because of the pressures on him. I think you mentioned——

Senator CASE. What were they?

Dr. YORK. You mentioned the speech in San Francisco, which was a surprise to many of us. It was not McNamara's usual reaction to this problem.

Senator CASE. What pressures do you mean, sir?

PRESSURES ON THE SECRETARY OF DEFENSE

Dr. YORK. Well, I suppose these things trace from many sources. I do not think there is a single cause or a pressure, but I remember back in the late fifties the intense interservice rivalry with respect to who was going to be allowed to do what in space and missiles, and it was finally resolved that the Navy would do Polaris; the Air Force would do the Titan, the Atlas, and so forth; and the Army would do the Nike-Zeus; that is, the antiballistic missiles.

Thus, antiballistic missiles are the only large program which the Army is allowed by the present set of rules which have been in effect for 10 years.

There are large numbers of persons whose careers are devoted to inventing anti-ballistic missiles, and when one kind of anti-ballistic-missile is opposed or shot down by one form of logic, it is not very hard to imagine that they will think of another.

But there are many possible reasons for why the thing keeps showing up.

I mentioned also that the invention of the MIRV does destabilize the situation, and that people have searched for some way of getting it stable again, and one place that people look is toward an active defense of the missile sites themselves.

That is why I mentioned we have come full circle—one turn around the spiral of the arms race.

It is logical, when one looks at it in a sufficiently narrow sense, to suggest that the missile sites be actively defended, and to suppose that this is a way of overcoming the instability introduced by the MIRVs.

I think this logic is based on too narrow a premise. But posing the question in strictly technical form and as one move to be made without necessarily thinking about the consequences, the invention of the hard-point defense is logical in this narrow frame of reference.

Senator CASE. But it is obviously difficult for you to accept anything based on such a narrow frame of reference, and that is the whole point of these things.

Dr. YORK. Well, that is the substance of my argument; yes, sir.

Senator CASE. And I think your colleagues have said the same thing.

Dr. Killian.

PROPONENTS OF THE ABM

Dr. KILLIAN. Yes.

I would want to emphasize how important it is that you hear some of the people that believe deeply in the ABM, because we may be conditioned or prejudiced in our views here, and I think you very much need to hear both sides.

There are people that I have great respect for who are deeply convinced. Perhaps you have already.

Senator GORE. I would like to say at this point that last week we heard Dr. Fink, who was Deputy Director of Defense Research and Engineering of the Department of Defense.

Dr. KILLIAN. Right.

Senator GORE. The subcommittee invited Dr. Foster, who presently holds this position, to be the first witness.

Dr. KILLIAN. Yes.

Senator GORE. But he cannot appear until a later date.

Dr. KILLIAN. Fine.

Senator GORE. So we have heard proponents and we expect to hear more proponents.

Dr. KILLIAN. Yes.

Senator GORE. The whole purpose of the hearing is to develop a body of information to help the Senate and the American people reach a reasoned judgment on this very important issue.

PRESSURES THEN AND NOW

Senator CASE. Mr. Chairman, I have just one further comment on the question of the pressures we were talking about.

This cannot be a new thing. President Eisenhower must have been under similar pressures, I assume, and you men know this. Were they any different, are they any different now than they were then? Are they any more persuasive for our national defense than they were then, as far as you see it?

I take it, obviously, you do not think so, but I just want to raise that specific question.

Dr. KISTIAKOWSKY. May I answer, Senator Case, at the risk of putting my foot in my mouth, because I will be speaking about areas in which I am totally lacking in competence.

But if you read Mr. McNamara's book, he does not advocate in that book, which was published after the San Francisco speech, the deployment of the anti-Chinese system, and to me, at least, as I read the speech, it looked as if that paragraph on Sentinel was tacked on, as almost a separate piece, to the speech.

Now, I have read in the papers and, as I say, I am absolutely unable to judge as to whether there is any validity to it or not, that a decision to deploy Sentinel was made for political considerations; that the Republican Party would make a major political issue in the campaign if there were no deployment. I read it in a Boston newspaper. That does not mean it is authoritative, of course.

Dr. KILLIAN. I should point out, Mr. Chairman, however, Mr. McNamara does include as an appendix to his book the statement on intended deployment, but it is not a part of his central argument in the forepart of the book.

Senator CASE. Mr. Chairman, I do not want to take any more time. I appreciate your consideration. I am deeply grateful to you.

Senator GORE. Senator Pell.

GAO DOCUMENT ON ABM DEPLOYMENT

Senator FULBRIGHT. Senator Pell, if you will yield, on this point, I hold a confidential document from which I would like to read three unclassified sentences. It is a report of the GAO on the proposed deployment of this system. The point I wish to note shows how the GAO has been frustrated by the secrecy surrounding costs and plans of the system, and I read two sentences:

"The General Accounting Office is making a continuing review of the activities of the Atomic Energy Commission (AEC) and the Department of Defense (DOD) in connection with the development and deployment of the Sentinel Antiballistic Missile System . . ."

Then later on:

"However, we are encountering delays in obtaining such information from the DOD, and we are therefore unable to estimate when we shall be able to provide this information to you."

That is a typical example. This is a very recent report, this month. This is what we are confronted with, and it is so very pertinent to what Dr. Killian was suggesting.

ADVICE OVERRIDING DEPARTMENT INTERESTS

Dr. KILLIAN. Gentlemen, if I may add a footnote to what Dr. Kistiakowsky has said, what you are commenting on, my experience as science adviser to the President, President Eisenhower, I was constantly impressed by his search for advice that would ride over the interdepartmental interest within the Government, and one of the reasons, I think, that led to the formation of the President's Science Advisory Committee and that whole mechanism was to try to get a way of bringing in expert advice that was not in any way connected with the protagonist or the antagonist or the vested interests within Government itself, and he believed very deeply in the importance of that.

MIRV RESPONSE TO SOVIET GALOSH SYSTEM

Senator PELL. Mr. Chairman, I was very struck by Dr. York's statement that MIRV was really a response to the initial intelligence information we had about Galosh. MIRV, to simplify this discussion a bit, has really increased the effectiveness of our weapons in the order of what would you say, eightfold?

Dr. YORK. It is very difficult to say because it depends against what, but one could say a fewfold or eightfold. That is a matter of detail.

Dr. KILLIAN. It is the relevance.

Senator PELL. So we have already had a substantial response, and if we went ahead with the ABM it would be what you might call a double response.

Dr. KILLIAN. Yes.

Dr. YORK. One important point. The response to a Soviet ABM was many ideas, including multiple warheads. MIRV, in its present form, followed that. I mean, someone could say that MIRV is not a response to the Soviet ABM, but it did directly follow from a much simpler device which was a response to the Soviet ABM.

Senator PELL. Yes.

STATE OF GALOSH SYSTEM

Now, there has been some confusion about the state of the Soviet ABM, of Galosh, and obviously keeping in the unclassified realm as we do, would it not be a correct statement that the general conclusion is that they have not forged ahead particularly hard with this system for the last couple of years, or do you think that would be an oversimplification?

Dr. YORK. I think that is a reasonable statement, that they have evidently had their own serious doubts about the efficacy of their system.

Dr. KILLIAN. I would hasten to say that I really do not know.

Dr. KISTIAKOWSKY. But I would agree with Dr. York.

Senator PELL. Thank you.

In this connection, I think it is doubly amazing because we all know these systems have a certain vitality, momentum of their own, and I was very struck by a statement that Secretary McNamara made in an interview with Life magazine in September 29, 1967, speaking about some of his opposite numbers in the Soviet Union, and I would like to read it in the record. Mr. McNamara said:

"Some of their generals—speaking of the Russians—have admitted that their ABM system is ineffective. They have done that very recently, within the last 6 months. But they probably are not the same generals who made the decision several years ago to deploy it. The generals who made that decision are similar to some Americans, both civilian and military, who back in 1959, 1960, 1961, were strongly urging that we go ahead with what was then known as the Nike–Zeus, which would have been similar to the present Moscow system.

"So I think what the Soviets did then was to follow the same kind of advice we were getting, but which we decided against. And now some of their generals admit it was wrong."

When you take that statement of Mr. McNamara's and you realize the slow down that has occurred since around Moscow, one, perhaps, is of the view that these generals, the newer generals, have had a certain effect on the program.

(The full text of the interview with Mr. McNamara appears in the appendix on p. 418.)

ATTITUDE OF SOVIET GENERALS

I was wondering if you had any discussions, particularly Dr. Kistiakowsky, with any of the people in connection with the disarmament committee meetings, from the Soviet viewpoint on this?

Dr. KISTIAKOWSKY. In the few conversations I have had on these subjects with the Russians, and they have been largely Russian scientists, senior scientists, there has been a substantial change of attitude in the sense that until a few years ago, their position was that defense against missiles is not only possible but is also essential and is not a subject for discussion because it is an automatic right of the people to have such defense.

That attitude, I am quite sure, has disappeared.

If I may, I would rather leave it at that general level.

Now, as regards cessation or slow down of the ABM system in Moscow, may I say, Senator Pell, that of course there has been quite a delay in slowing it down after the time when, to any sensible person, it would have been obvious that the system was not good; in other words, there always is a large inertia with such projects.

On the other hand, I am sure that they must be doing R. and D. just like we are doing to see if they cannot invent an answer to the maiden's prayer, the perfect defense.

Senator PELL. Thank you.

In reading the statements of the three witnesses, it is obvious that Drs. York and Kistiakowsky think we should not move ahead in this area.

Dr. Killian's view, as I understand it, is more that we ought to have a high-level Government group discuss it. But if you were forced to vote, as we will be, on this issue in another few days, and I would say your knowledge is equal to any of us, how would you vote?

Dr. KILLIAN. I have said that at the meeting called by Secretary McNamara, I expressed opposition to the deployment, and I share those views today. But I cannot say that those views have been buttressed by careful up-to-date examination of the situation.

Senator PELL. I would take your knowledge as against mine any day in this field, sir.

COMPREHENSIVE REVIEW OF STRATEGIC SYSTEMS URGED

Dr. YORK. May I use this as an opportunity to reenforce what Dr. Killian said about such a committee or such a task force in terms that you noted earlier.

Here we are talking about the ABM, but the ABM is only one small part of this whole thing. It is the only—it is uniquely the only—piece of all of this that has surfaced to the point where people are talking about it. Certainly, it is not the only piece that ought to be talked about and, therefore, Dr. Killian's proposal, even though one has to make a decision right away in this case, Dr. Killian's proposal, I think, is a very good one to bring up all these other things that are going on, that need to be talked about, that ordinarily are only talked about in closed hearings by persons whose lives are tied up with them, whose careers are tied up with the development of systems.

I am very much in favor of Dr. Killian's proposal, fully recognizing that in this particular one instance one needs a decision now, and it is too late or it may be too late.

Dr. KILLIAN. However the decision may go now, it will still be important to have this kind of comprehensive review.

NUCLEAR SYSTEMS IN OCEAN SPACE

Senator PELL. I completely agree with you; this is just one part of a general picture. I have a special concern with the development of such weapons systems for use on the seabed and ocean floor—an area encompassing 70 percent of the globe, and still devoid of weapons of mass destruction. General discussion on this and related issues started yesterday in New York under the auspices of the U.N. Committee on the Peaceful Uses of the Seabed and Ocean Floor. The 18-Nation Disarmament Conference, which, I believe, opens next week, will be discussing specifically the question of seabed disarmament. So far we do not have a viable, practical policy on this disarmament issue, and yet, it may be of greater urgency than the ABM matter, if for no other reason than the costs involved. Seabed disarmament, or nonarmament actually, may not surface for some time, until the press and public finally learn what is being contemplated. A committee such as yours would get involved in this issue more quickly.

EFFECT OF ABM ON A NEGOTIATING POSITION

Another point that concerned me was the view of the Secretary of Defense that it would improve our negotiating position if we started on an ABM system. This is a view I would expect the Secretary of State to make, not the Secretary of Defense, because the latter's business is not negotiating—his business is systems.

I was wondering, though, as long as this point has been raised, if you have any views as to whether it would improve our negotiating position or not.

Dr. KILLIAN. I would take the view that it probably would not, but I can see that there is a domain of argument here.

Senator PELL. Yes.

Dr. KILLIAN. And I would welcome others arguing for the other position.

Senator PELL. Thank you. I congratulate you all on your statements.

Senator GORE. Senator Aiken.

Senator AIKEN. No, Mr. Chairman. I will yield my time to Senator Cooper, who has several questions prepared.

Senator GORE. Senator Cooper.

Senator COOPER. Thank you, Mr. Chairman.

WITNESSES' LONG ASSOCIATION WITH ABM ISSUE

I join my colleagues here in saying that I think this committee, and also the people of the country are fortunate in hearing three witnesses of scientific and technological competence beyond question. I think it is also very significant that all three have had an important part in the policy regarding defensive and offensive nuclear weapons for such a long time.

Dr. Killian said he had been associated with the ABM issue since 1954; both Dr. York and Dr. Kistiakowsky since 1957.

I recall at the time of the so-called missile gap that I had the opportunity to talk with Dr. Killian and Dr. Kistiakowsky about that issue.

But can you all say that since 1960 that you have kept abreast of the technological developments in nuclear weapons, and that you have been provided with the intelligence that would be available to the Defense Department, particularly when you were called back for consultation by Secretary McNamara?

Dr. KILLIAN. Yes.

Dr. KISTIAKOWSKY. Yes, that would be fair to answer.

Senator COOPER. I oppose deployment of the ABM system. But, as you yourselves say, there are many in the Defense Department, and there are other scientists who support its deployment.

I think our people are concerned about it. They want to be certain about the security of our country, as all of us do. For the moment, I will be the devil's advocate, and direct my questions to some of the fears and some of the propositions that have been made in support of the deployment of this system.

I think one of the fears that some people have is that the United States may be falling behind the Soviet Union in its research and development.

EFFECT ON OUR DETERRENCE OF A SOVIET DEFENSE SYSTEM

My first question is, do you know of any actual deployment of an ABM system which might upset the credibility of our deterrence? For example, the defense system around Moscow, do you consider that the Galosh system would affect the credibility of our deterrent?

Dr. KISTIAKOWSKY. My answer is a flat "No."

Dr. KILLIAN. I share that view.

Senator GORE. We have the answer from two. We did not hear from Dr. York.

Dr. YORK. I agree, of course.

Senator COOPER. Do you consider the FOBS [fractional orbit bombardment system] have upset or challenged the credibility of our deterrent?

Dr. YORK. No. It is a complicating factor, but I do not think it has challenged the credibility of the deterrent, no.

Dr. KISTIAKOWSKY. It, by the way, will add to the problems of ABM in respect of that hair-triggered reaction because of the still shorter time available for radars and computers to identify the FOBS warhead as for what it is, since it is coming low over the horizon and, therefore, cannot be seen so far out in space.

Senator COOPER. Is the Sentinel system an answer or an effective counter to that or should there be some system, defensive system, developed which would meet the threat of the FOBS?

Dr. YORK. Well, I have expressed myself earlier as having great doubts about the Sentinel system working in any case. That certainly includes against the FOBS.

The FOBS would be harder for Sentinel to cope with, but since I believe Sentinel cannot cope anyway, the fact that it is harder does not make much difference.

Senator COOPER. Is that the opinion of the panel?

Dr. KILLIAN. I do not have one.

Dr. KISTIAKOWSKY. Yes.

Senator COOPER. I remember reading Secretary of Defense McNamara's posture statement of a year ago, in which he said the United States could have developed FOBS, but decided it was not worth it.

THREAT TO SOVIETS OF POLARIS AND POSEIDON

Does our Polaris system and the Poseidon system which is being developed, are they comparable to any threat that FOBS might give the United States; are they a similar threat to the Soviet Union?

Dr. YORK. As far as this kind of strategic contest is concerned the sea-based systems are similar to the FOBS. That is to say, what the FOBS add is something that comes in at a lower altitude, that comes in from a different direction than one would otherwise suppose, and that comes in with shorter warning. The sea-based deterrents also do all those things.

Senator COOPER. So in that respect then, we do have some balance with the Soviet Union?

Dr. YORK. Yes.

Senator COOPER. And even an overwhelming superiority, do we not, with the 650 or so Polaris missiles, warheads; is that correct?

Dr. YORK. That is correct.

Dr. KILLIAN. Yes, I think it probably should be added, that, the FOBS may have some serious disabilities. The warhead it carries is probably small, and the guidance is a problem, and so on, so it is not by any means an ideal weapon.

Dr. YORK. The idea occurred here long ago. Back in 1960 or even 1959 we began to hear proposals about weapons in orbit, the idea of having a weapon up there either for a fractional turn, as the FOBS, or for many turns, and it was rejected for purely practical reasons. It just really is not a very good idea.

UNITED STATES AND SOVIET DEVELOPMENT OF MIRV'S

Senator COOPER. Secretary Laird suggested in his testimony that the Russians had gone very far with the development of MIRV, and that this development posed a great problem to our defenses.

I think that it is recognized that the MIRV is a great problem, but I thought since Secretary Laird made this assertion—I do not want to misquote him or judge his intentions—is the United States behind Russia in the development of the MIRV?

Dr. YORK. I would say not.

Senator COOPER. Is that agreed?

Dr. KILLIAN. I would be very much surprised if they were.

Dr. KISTIAKOWSKY. So would I.

On the other hand, I am not in possession of the evidence which Secretary Laird said he has and, therefore, it would be very awkward for me to judge.

Dr. YORK. Secretary Laird did not say we were behind in the development of the MIRV.

Senator COOPER. No. He suggested the Russians were proceeding very effectively in this direction.

Dr. KILLIAN. I want to make clear I do not have the latest intelligence estimates on any of these problems so I am not saying——

Senator COOPER. But even if we assume that the Russians are proceeding very speedily and effectively in this direction, the Sentinel system as proposed, as an area defense, would not be effective against MIRV deployment by the Soviet Union.

Dr. KISTIAKOWSKY. No, it would not.

EFFECTIVENESS OF OUR RESEARCH AND DEVELOPMENT

Senator COOPER. Are you acquainted or have you a judgment to make about the effectiveness of the research and development of our nuclear weapons systems? I ask this question, because Secretary Laird said the Soviets were proceeding very effectively and were spending much more money than the United States in research and development.

That assertion, of course, would cause some fear in the Congress, and among our people. It would raise doubts about the credibility of our deterrent and would give some support for deployment of an ABM system or some modification.

Can you state from any knowledge you have whether you think our research and development system is an effective one?

Dr. KILLIAN. To start this response, I take it you are talking about military research and development and not the other kind?

Senator COOPER. Yes, purely military.

Dr. KILLIAN. I think it would be appropriate to say we have extraordinarily vigorous R and D programs going on in behalf of defense projects, some of them superlatively good, in my judgment.

I would also want to add, however, that I think in recent years there has been some dampening of the innovative spirit in the defense domain that has troubled a lot of people, including me.

I think so much emphasis, and I say this with care, so much emphasis, on the cost-effectiveness approach, and so on, has not in general contributed to the vigorous innovative kind of experience that we once had, and this is a problem.

Senator COOPER. I assume that you believe that the committee which you have suggested should be created, should direct part of its energy to this problem.

Dr. KILLIAN. I would think very definitely it should look at the quality of our effort, yes.

EXTENT OF DANGER IN DELAYING ABM DEPLOYMENT

Senator COOPER. Three witnesses testified last week—well, two said expressly that they felt—there was no danger to the United States in postponing any decision upon this or in failing to proceed immediately with deployment of this system.

As I recall the third, Dr. Fink was not certain. But is your judgment similar to that of Dr. Ruina and Dr. Bethe?

Dr. YORK. Yes. I stated in my testimony that we could easily afford to wait until at least after these present attempts to get something moving again in the arms control area have been fully explored, the reason being that the current ABM proposals are the easiest to implement, and the ones on which there are the most alternatives, especially in the case of the hardened defense.

Dr. KILLIAN. I would favor deferral and not be too greatly concerned about it.

Senator COOPER. Dr. Kistiakowsky.

Dr. KISTIAKOWSKY. I, also.

Senator COOPER. You also say that?

Dr. KISTIAKOWSKY. I have already said I do not see any urgency to decide on the Sentinel now, I mean start deploying one now.

Senator COOPER. The impression is given by some that we would endanger the security of the country if the Congress did not provide funds for the deployment of this system. There is that kind of fear. So I think it is good that you, who know so much about it, to make that statement. I do not know what the President will do. I would hope very much that his decision would be to defer deployment.

EFFECTIVENESS OF ABM DOUBTED

All three of you have taken the position that was taken by two of the witnesses at the last hearing: that the deployment of the Sentinel system, as had been proposed by Secretary McNamara, and then supported by Secretary Clifford, now I believe by Secretary Laird, would certainly not be effective against Soviet attack. I believe you said that the Chinese, with penetration aids, would render the proposed ABM ineffective.

Dr. YORK. That is right. And then, in addition, we brought out what I regard as a fairly high probability of what we call catastrophic failure or massive failure; that is, it either won't react at all or not at all correctly.

Senator COOPER. That is the judgment of the panel, I know from your statement, is that correct?

Dr. KISTIAKOWSKY. My concern about so-called catastrophic failure that Dr. York just speaks about is just a notch less than his.

Now, there should be very definite concern. I think it is a possibility, but I think there are so many other things wrong with it that I would not give to that the extra emphasis.

MODIFIED HARD POINT DEFENSE

Senator COOPER. It has been suggested that a modification might be proposed as follows: the Sentinel components, the Spartans, would be moved away from the cities and that in addition Sprints might be placed at the missile sites.

There would be a combination of area defense and a terminal defense.

What would be your reaction to such a modification?

Dr. YORK. Well, the same—that is one version of the hard point defense which is then combined with the area defense.

I think my feeling towards that is the same as that towards either one independently. It would not be effective.

It is another element in the arms race, and who knows what the response would be.

We have suggested a half dozen kinds of responses, all of which result in a situation worse than before. It is hard to predict which one is going to happen or which combination is going to happen.

Dr. KISTIAKOWSKY. I would, sir, repeat almost word for word what Dr. York has said, and so I will save the time. I agree with him.

I think it is an incentive to an arms race that is not effective. The Sentinel system is not designed for hardpoint defense, and it is sort of fudging the issues to say, now let us put it at hard sites.

Senator COOPER. I think so, too. That is the reason I asked the question.

Dr. KILLIAN. I would like to make clear, Senator Cooper, that I have not had a recent briefing on the performance of the system, and I would not want to make sharp—try to make solid answers to the questions about catastrophe and so on.

My concern and opposition go back to the whole action-reaction situation. That is what troubles me more.

Senator COOPER. I understand. You have a well-balanced position; it is a position that all of you have taken. You have taken into consideration the security of our country, the arms race, and possible negotiations.

MISSILE SITE DEFENSE

Then, if the decision should be made to deploy simply a missile site defense, a terminal defense, I believe all of you have said—and if I am mistaken, I wish you would correct me—if such a decision should be made it should be modified; it should be one which is unequivocally known in this country and by the adversaries to be a missile site defense.

Dr. KISTIAKOWSKY. Yes, sir. I think that is very essential. But before this decision were reached, I would join both Dr. Killian and Dr. York in saying the whole issue of what is the safest deterrent should be looked at again. It may be that such deployment is not the best—may I use a bad word—the most cost-effective way—but it is actually a good word, only it has been misused occasionally—the most cost-effective way of doing that.

Furthermore, I am, in an intuitive way, still concerned about the momentum acquired by such a deployment, but that is a separate issue, and I would hope that the Senate, the Congress, could prevent this from happening.

Dr. YORK. I would go a little bit further, precisely in this matter of further momentum in the arms race. I think that the only circumstances that I can see under which ABM deployment would be a positive move—and then I am still not sure—but the only circumstance under which I can see that it might be is as a well-integrated part of some well thought out arms control step, and I mean an agreed one as a part of some kind of a system of treaties or agreements or something like

that, in which the purpose was well understood, and in which there were other measures, and in which this was not the only measure.

For example, if one takes a step to reduce the number of offensive weapons, then it might be that it is useful to try to kid yourself into believing that you have defended the ones that are left or maybe you really can "teach horses how to fly." It could be useful.

ALTERNATIVE DEFENSE METHODS FOR MISSILE SITES

Senator COOPER. I read your testimony, and I thought you suggested that if the decision should be made at some later time to deploy a system to protect our missile sites, it ought to be considered and developed in such a way that it would be unmistakably for that alone, and second, I believe you suggested that there were even alternative methods of defense for the missile sites themselves.

Dr. YORK. We have mentioned that.

Dr. KILLIAN. Superhardening.

Senator COOPER. And third, I thought you said if such a system should be deployed, it ought to be one as a part of a creditable total weapons system of the United States. If it were possible to incorporate in some agreement—I assume with the Soviet Union—through an arms control limitation, there might then at that time be some acceptability for that kind of a system. Am I correct in those?

Dr. KILLIAN. Yes.

Dr. YORK. Yes.

Senator COOPER. I hope, Senator Case, you will be heard.

WHITE HOUSE APPOINTMENT ARRANGED

Senator CASE. Would the Senator yield at that point, because I am very happy to say, Dr. Kissinger has asked me to tell you he would be very happy if you could see him at 5 o'clock at his office, all three of you, and that the President would like very much to be there if he can, and he will be if he can. He is not sure that he will be able to rearrange his schedule, but you have a firm invitiation for 5 o'clock with Dr. Kissinger.

MAINTAINING THE CREDIBILITY OF OUR NUCLEAR DETERRENT

Senator COOPER. I just have a few more questions. I think I agree with what you all have said, but I believe that in discussing all of this, one of your chief concerns is that we believe that the stability and the credibility of the nuclear deterrent not be altered by some unilateral movement, some unnecessary escalation by our country or the Soviet Union.

Dr. KILLIAN. The credibility of our deterrent, I think, is vital. We should do nothing to reduce that.

NEGOTIATING THROUGH STRENGTH

Senator COOPER. My second question goes to the point of negotiations. Senator Pell asked you about the contention that the deployment of such an ABM system would provide assistance to the President in negotiations. This is an assertion which we have heard so much about in connection with so many other so-called negotiations through strength.

We have failed in a number of other such situations, I might say, in Vietnam and other places.

But would you consider that an ineffective system, known to be so by the Soviet Union, would provide the United States with any great strength in negotiations?

Dr. YORK. I would think the uncertainties would create an atmosphere of confusion and further uncertainty that would make negotiation more difficult because I do not think these doubts are going to go away, and I feel reasonably sure they exist on both sides, and they exist on both sides when each side looks at both his own and the other side's system.

I do not know all that much about international negotiations, but it is difficult for me to see how one could say the situation had been improved by so much uncertainty.

Senator COOPER. Do you have any judgment on that?

Dr. KISTIAKOWSKY. I share that judgment.

Senator COOPER. Dr. Killian.

Dr. KILLIAN. Yes; I do.

Senator COOPER. This may be a question for the State Department, but your judgment will be of important help to us.

TIMELINESS OF ENTERING INTO NEGOTIATIONS

Considering the long efforts of the United States to enter into agreements with the Soviet Union, beginning at the time when we had nuclear weapons and the Soviet Union did not, many efforts to enter into agreements were made under President Eisenhower, President Kennedy, and President Johnson, do you know of any situation in the past where there has been any better opportunity than now to enter into negotiations—whether they are successful or not is another question—to enter into negotiations with the Soviet Union on limitation and control of nuclear weapons?

Dr. KILLIAN. I am not an expert in this field, but it would seem clear that the stability of our deterrent over the past few years has provided an environment now for discussion that looks encouraging.

Dr. KISTIAKOWSKY. It would seem also to me, Senator, that, perhaps, now is the best opportunity. Of course, in the past these discussions were exceedingly difficult and fruitless. And only, on the peripheral issues like the partial test ban, no arms in space, could agreement have been reached. But maybe now, at least judging from newspapers there may be a much more favorable atmosphere and, as I said earlier, I was very happy to learn that President Nixon is determined to pursue this subject as vigorously as possible.

Dr. YORK. I am quite uncertain. I suppose things may be better now than they were. If this is a good time it may not stay a good time very long, and we ought to seize it. Whether it is good or not, I am not quite so sure, but if it is good I fear it is transient, and we ought to do something about it.

TAKING TESTIMONY FROM OUTSIDE WITNESSES

Senator COOPER. I have respect for your statements. I think Senator Fulbright asked you very properly if you have been asked to testify before the Committees on Armed Services and Appropriations.

Last year in the closed-door session of the Senate, Senator Fulbright addressed that question to our distinguished colleagues of the Armed Services Committee, and we were told, of course, that you had not—nor had any outside witnesses been called to testify other than those who were in the Government.

Senator Stennis, on that day, said that he would hear witnesses, and following that debate I did write him. He has replied to me, as he has told Senator Fulbright on that date, that he would hear witnesses, and I am sure he will be asked to hear you all before his committee.

I might just make one other comment on whether or not we can consider all these matters because they are classified, and we cannot really talk about them. We did find out in our closed-door session that there was nothing that the Armed Services members could not discuss there that had not already been discussed in open debate on the floor of the Senate, so I do not think there is much problem about that.

I thank you very much.

Senator GORE. The committee is pleased with the interest of Senators who are not members of the committee, and are honored with their presence when they come.

Senator Percy, would you have a statement or questions?

Senator PERCY. Mr. Chairman, thank you very much, I appreciate your thoughtfulness in permitting me to be with you this morning.

COMMITTEE HEARING BOTH SIDES

I think Dr. Killian raised a very good question as to whether this committee was hearing both sides, and I think the record is quite clear that the committee has heard both sides and wants to continue to do so.

Those Members of the Senate who are not members of the appropriate committees are spending a good deal of time on this subject, and have had a good deal of help on both sides.

Dr. Kistiakowsky, I think it was a year ago we had our first briefing together, and I have spent at least four times as much time, I think, hearing proponents from all the services—Air Force, Navy and Army—give their best arguments, so I could balance out my judgment.

OPINIONS NOT SOUGHT IN PRESIDENTIAL REVIEW

I would be interested to know whether, in the total review of this program that was ordered by the President, of the Defense Department, you were asked your opinions, whether the Defense Department approached you, and whether your thoughts are embodied in the study made for the President?

Dr. KISTIAKOWSKY. No, sir; they have not approached me.

Senator PERCY. Dr. Killian.

Dr. KILLIAN. No.

Senator PERCY. Dr. York.

Dr. YORK. No.

Senator PERCY. I wonder if your thoughts had been solicited then by the White House, apparently not by Dr. Kissinger, but by Dr. DuBridge, who is the science adviser, and will be involved in this decision.

Dr. KISTIAKOWSKY. No, sir.

Dr. KILLIAN. I would hasten to point out there has now been a PSAC panel reviewing the aspects of the ABM. We were not members of that panel, and there is no reason why we should have been. I think it was announced in the paper that the results of that panel study have been made available to the President.

Dr. YORK. Dr. Kistiakowsky and I are both members of the General Advisory Committee of the Arms Control and Disarmament Agency which advises usually the Director of that Agency, but also by law works for the President and the Secretary of State. Over a period of years, though specifically not in these last few months, but generally over the years, we have been involved through that committee with this and related questions.

Senator CASE. Would the Senator yield? I wonder, Mr. Chairman, if we might not ask if the panel report referred to by Dr. Killian could be made available to the committee for study privately and possibly to that extent appropriately be included in our proceedings.

Senator GORE. Would that be agreeable and possible?

Dr. KILLIAN. I cannot answer that question.

Senator GORE. The staff will undertake to act on the Senator's suggestion.

Senator CASE. I merely raise the question.

Dr. KISTIAKOWSKY. That would have to be Dr. DuBridge to find out whether it was possible.

Senator GORE. The staff will undertake to obtain it.

POSSIBILITY OF REACHING ARMS LIMITATION AGREEMENT WITH THE RUSSIANS

Senator PERCY. In the area of negotiating with the Soviet Union I have talked with many people who are exceedingly skeptical of any agreements with the Soviet Union. They simply come out with a flat statement, many of them: "You can't trust the Russians and, therefore, what good does it do even to negotiate with them?"

I would like to ask whether in your judgment a useful agreement could be reached whereby the entirety of it could be protected in, say, the area of deployment of ABM systems and protected by nontechnologies such as satellite reconnaissance or other means? Is it worthwhile for us to try to sit down and try to negotiate, and if an agreement can be reached, can we draw one, in your judgment, the integrity of which can be preserved by known technology, and would not necessarily require, say, international inspection onsite in the Soviet Union which we know would present certain problems?

Dr. KISTIAKOWSKY. Yes, Senator Percy, I think that certain types of arms limitation agreements concerning ABM and those offensive missile forces, which are not land-mobile, not hidden under the surface of the ocean or in trucks and whatnot, could be worked out which would be verifiable unilaterally. In other words the verification would not depend on any teams of inspectors going to the countries involved, and so on. Of that, I am completely convinced, and I have a somewhat different feeling about this business of not being able to trust the Soviet Union.

It is not a question of trust, but I think in these matters it may turn out very likely to be also to their interest to reach an agreement, just

as it was evidently also to their interest to reach an agreement on a partial nuclear weapons test ban. Now we have it 6 years in effect, although both sides have made minor infractions by leaking out some radioactivity into the atmosphere.

Dr. KILLIAN. But not intentionally.

Dr. KISTIAKOWSKY. But not intentionally, and the whole record is extraordinarily impressive. That again, of course, was a unilaterally verifiable type of an agreement.

RUSSIANS ACT IN SELF-INTEREST

Dr. KILLIAN. Having been involved back in 1958 with the reopening of discussions on nuclear test limitation, and having seen the way the conference of experts at Geneva came to an agreement, subsequently complicated by new data that came into the picture, nevertheless, I think there was an encouragement in the possibility that the Russians will for self-interest reasons come to agreement.

I would not trust them, but it would be to their self-interest, and it would be to ours, too.

Dr. YORK. Yes. I am in substantial agreement that there is self-interest on both sides. I believe that given the unilateral capability such as you have suggested, that probably, that almost certainly, there are regions in which one can safely undertake arms control and disarmament agreements.

One has to say there is always going to be some residual risk. That risk has to be compared with the obviously very great risks of the arms race itself. If one is looking for a risk-free situation, one won't find it.

The only thing you can do is compare risks. We have been living with the risk of the arms race so long, with that very large number of missiles parked over there and aimed right at us, that we have somehow gotten used to it. We have forgotten that we are living under a tremendous risk at this very moment.

Senator GORE. Dr. York, I would like to ask you an entirely nontechnical question. Do you know of any greater mutuality of interest than self-preservation?

Dr. YORK. It sounds like a great case to me.

ABILITY TO TRUST GOVERNMENTS DOUBTED

Senator FULBRIGHT. May I ask, do you know of any governments we can trust in the moralistic sense? What about the Germans in World War I, what about the United States and its treatment of the Indians? This idea that you trust them because they are nice people is rather nonsense, is it not? Governments act in their own self-interest.

Dr. YORK. You have to find areas of mutual self-interest.

Senator FULBRIGHT. Any of these governments.

It seems to me it is not a valid objection, if I may say so, to the Senator from Illinois.

COMMENTS OF OTHER SENATORS

Senator PERCY. I have just one last comment. I have discussed the issue with many of my colleagues. I would like to say that Senator Stennis has been very frank in expressing his opinion, his doubt as to really whether he knows that the system will work, his very open-

mindedness about saying he would be glad to have opponents of the system at his hearings—all of which is good reason not to deploy, but to defer this decision until all the evidence is in.

I have discussed this also with our colleague, Senator Barry Goldwater, and I think his comments are very interesting and pertinent. He said to me, "To be perfectly frank with you, I have serious doubts we could ever build one without violating the test ban treaty of 1962. I say this because I directed a question during the Preparedness hearings to Dr. Foster as to whether he could build an ABM without testing, and he said, no." So there are very, very serious doubts being expressed, and I would just like to say, Mr. Chairman, on the basis of the year and a half or so that I have tried to put in what time I could to study the issue, that I would say it is not just a military decision at all, because there are doubts in the military about the wisdom of this.

REASONS FOR URGING DEFERRAL

But I would say militarily it is not the right decision to go ahead at this stage. It is not, diplomatically. It would be like saying before we even start that we do not think we are going to be able to reach agreement, therefore, we are hedging our bets, and this might prevent us from negotiating on the kind of basis we might have available as an opportunity now.

Economically it is not, because we cannot spare this kind of money now. We need it for many other systems that are more proven than this within the Defense establishment, and certainly we need the money in other areas of nation building here at home.

Psychologically, I think it is wrong. It would get us into an arms race, and I am most deeply concerned about the disunity that we are creating in this country. It would be another issue such as Vietnam that can divide the country, and this is why I have, to the extent that I could, implored the administration to take into account this is not a unilateral decision that can be made even by the President of the United States with success.

The Nation must be behind this decision, and the Nation is very divided over the decision now; certainly the Congress of the United States, and this body, is very divided. So I think these hearings are exceedingly helpful. They are very timely, and they reflect credit on our system of government.

Mr. Chairman, an article has just been handed to me by Senator Cooper on Dwight D. Eisenhower's statement in Vista of January–February 1968 on the ABM system, and I request permission that this be included in the record.

Senator GORE. It will be included in the record.

Thank you, Senator Percy.

(An excerpt of the article referred to follows: the full article appears on p. 409 of the appendix.)

EXCERPT FROM "WAR AND PEACE AND THE UNITED NATIONS: AN EXCLUSIVE INTERVIEW WITH GEN. DWIGHT D. EISENHOWER," VISTA VOL. 4, NO. 4, JANUARY-FEBRUARY 1968

Question: Would the $5 billion antimissile missile system recently announced by Secretary McNamara fall into the President's category of "excessive arms?"

I wasn't prepared for his vivid response. Five billion! That was only the beginning, the President said impatiently. It would buy a pilot establishment, nothing else. And then we would have to go on and on until we had "the works."

He drew a spiral in the air with his forefinger as he talked. You'd get up into the $20 billions, then the $30 billions, and the $40 billions—just for the United States. Every little town and locality would insist on having a shield. Even Gettysburg. And, soon, too, all your allies will insist on having it. The President had continued to trace the spiral until it had gone as high as his arm could reach. Right *now* our arms expenditures create economic difficulties, he said in a hard tone, as his spiraling arm dropped to his side. But, as of now, it is possible that we will have to take on this great additional cost.

He paused, swiveled to gaze out the window at the windstripped trees, and finally turned back to finish up on the antimissile missile. He thought the value of the project was still questionable. Now, mind you, the President said, I wouldn't call it a form of excessive arms, if I thought it would be effective. But I tend to agree with McNamara when he minimized the need for the thing. If it's a "thin" defense, as they now describe it, it won't appreciably improve our defensive posture. And, anyway, it's still axiomatic that the best defense is a perfect offense. We've got *that*.

Senator CASE. I think it would be well to point out for everybody's benefit, looking and listening, that President Eisenhower very clearly indicated he was against it.

Senator GORE. Senator Fulbright.

Senator FULBRIGHT. I have only one question.

IS ABM DEPLOYMENT INCONSISTENT WITH NPT?

Dr. York, you have a sentence in your statement which prompts a question. You say: "Such a false hope is extremely dangerous if it diverts any of us from searching for a solution in the only place it may be found: in a political search for peace combined with arms control and disarmament measures."

We are presently considering on the floor of the Senate, starting yesterday, the debate on the Nonproliferation Treaty in which article VI says that we should proceed in good faith to negotiate a cessation of the arms race. Would you feel that to proceed with the ABM would be inconsistent with the Nonproliferation Treaty?

Dr. YORK. It is inconsistent with the spirit, I think.

Senator FULBRIGHT. That is what I mean, the spirit.

Dr. YORK. Of course, because it is an element in the arms race. In a narrow legal sense, the ABM, Sentinel system, is probably not inconsistent with the Nonproliferation Treaty.

Senator FULBRIGHT. I wanted to make it clear I did not mean specifically and literally, but it seems to me that specifically that treaty and its article VI would be inconsistent at this time with deploying the ABM or any similar system.

Would you agree to that? Would you all agree with that?

Dr. KILLIAN. That treaty is so important that nothing should be allowed to handicap it in any way, it seems to me, although I think you had testimony last week from someone in this field, did you not, Mr. Smith——

Senator FULBRIGHT. That is right.

Dr. KILLIAN (continuing). That it would not interfere?

Senator FULBRIGHT. But he was a Government witness.

We are today having nongovernmental witnesses.

Do you have any feeling about that, Dr. Kistiakowsky?

Dr. KISTIAKOWSKY. I would subscribe to what Dr. York said, namely, the spirit of the treaty certainly would argue against our em-

barking on such a large new military venture, with unpredictable arms race possibilities. Legally, we would not be breaking the treaty.

Senator FULBRIGHT. Yes.

Dr. KISTIAKOWSKY. And so, Mr. Smith was perfectly right in what he said then, presumably.

ANSWER TO PROBLEMS PROPOSED BY NUCLEAR WEAPONS

Senator FULBRIGHT. Great scientists as all three of you are, do you feel that the answer to the problems proposed by nuclear weapons is in the field of weapons or as Dr. York says, in the political search for peace? Would you agree with that?

Dr. KILLIAN. It is in both fields. It seems to me they are intertwined.

Senator FULBRIGHT. Intertwined, but you cannot rely just on the development of weapons to keep peace.

Dr. KISTIAKOWSKY. No, sir.

Senator FULBRIGHT. You all agree to that?

Dr. KISTIAKOWSKY. I think the whole history of the last 25 years shows that the development of new weapons really does not improve our national security.

Senator FULBRIGHT. The increase in our capacity for destruction has led to the decrease of our security, has it not?

Dr. KISTIAKOWSKY. Yes, sir.

Senator FULBRIGHT. You all agree to that, do you not?

Dr. YORK. Yes.

Dr. KILLIAN. Yes.

Senator GORE. I have an editorial which appeared in today's New York Times which I would like put in the record.

(The editorial referred to follows:)

[From the New York Times, Mar. 11, 1969]

IN THE NATION: A DECISION THAT MAKES ITSELF

WASHINGTON, March 10.—Mr. Nixon's interesting custom of setting dates upon which he will deliver major policy pronouncements has this capital positively quivering in anticipation or dread of his promised decision on the antiballistic missile system. In fact, the case against ABM deployment is so overwhelming that it is hard to see how the President could decide for it.

Even the technical feasibility of the system is in doubt, particularly if deployment is to be justified by placing Sprint missiles to protect ICBM sites; and the Defense Department's research director, Dr. John S. Foster, warned two years ago that the whole Nike-X system—now known as Sentinel—would soon be obsolete.

The rationale first advanced by the Johnson Administration, that Sentinel some day would protect the nation against a Chinese missile attack, has been discredited by no less a hawk than Senator Richard Russell, a pillar of the armed forces establishment in Congress. "The Chinese are not completely crazy," he has said. "They are not going to attack us with four or five missiles when they know we have the capability of virtually destroying their entire country."

Now the ABM defenders have virtually abandoned the Chinese rationale and talk of deploying Sentinel to protect ICBM sites from new Soviet multiple-warhead weapons. But Senator Cooper of Kentucky has pointed out that no one has produced evidence that the state of Russian weaponry makes it imperative for the United States to deploy such defenses; and two authorities, Dr. Hans Bethe and Dr. J. P. Ruina, told a Congressional hearing last week that they knew of no such evidence.

The cost estimate attached to Sentinel—about $5 billion—is conservative at best, and Senator Stuart Symington has effectively demonstrated that defense hardware costs always mushroom beyond Pentagon estimates. Moreover, the out-of-pocket cost to taxpayers is the least of it, while the worst is that these same dollars could be and should be used for all those domestic social needs so long starved for funds by the devouring demands of the military.

INSURING MILITARY EMBRACE

Politically, for the President to opt for Sentinel against these social needs, or even to insist, Johnson-like, that we can have missiles *and* social programs, would throw his Administration into the arms of the military-industrial complex and its servants in Congress, insuring for another four years the pre-eminence of generals and militarists; because such a decision would repudiate the most progressive forces in Congress, now gathered in bipartisan opposition to the ABM system, and further alienate all those voters who already question Mr. Nixon's concern for the poor and the black, and doubt his interest in the quality of American life.

STEP TO COMPLETE SYSTEM

The deployment of an ABM system, moreover, however "thin," ineffective or near obsolescence, will be regarded by its victorious proponents as a "building block" in a vastly more expensive ABM defense against Soviet missiles. "It is the first step," Senator Russell said of Sentinel, "toward the deployment of the complete system that I think is required."

But the estimated $40-million cost of the "complete system" that Russell and others really want to develop from Sentinel deployment is not much better than an arbitrary guess; and former Defense Secretary McNamara has pointed out persuasively that even the "complete system" would be penetrable by the sophisticated Soviet weaponry its deployment would force them to build.

Above all, a decision to deploy an ABM system now might well trigger what McNamara called an 'action-reaction phenomenon that fuels an arms race." The Soviets might and probably would step up their offensive or defensive missile armaments, or both, in response; they might recoil from the nuclear arms control talks Mr. Nixon has said he desires; and military hardiners in Moscow might well picture themselves as vindicated and find their influence enhanced for years to come.

If these arguments, all of which are being made to Mr. Nixon not only by Democratic liberals but by such Republicans as Cooper, Javits, Percy, Brooke and Hatfield (even John Stennis, the Armed Forces Committee chairman, has expressed reservations), should persuade the President, he even has at hand a sound political explanation just waiting to be made.

He could say that the proposed ABM system needs more study and further development, which it does. He could add that this need dovetailed with his desire as a peacemaker to defer deployment at least until he had determined whether the Soviets would negotiate in good faith on arms control. And he could play on the disenchantment of Congress and the public by pointing out that deploying the Sentinel was Lyndon Johnson's idea, anyway. After all, this is a new Administration, isn't it?

Senator GORE. Senator Case has one remaining question.

Senator CASE. It is very difficult for us to let you go because this is an extraordinary panel. I promise I will not trespass on your time except to make this one point.

SPEED IN STARTING NEGOTIATIONS OF MAJOR IMPORTANCE

It seems almost a truism that the more complicated and more numerous weapons become, the more difficult an arms limitation agreement would be. So speed is a matter of first importance.

In this connection, I have heard one of your colleagues express the view that it was most desirable to get at the business of negotiating arms reduction promptly and before any further complication of weapons, whether offensive or defensive, occurred for this rather

specific reason: that the Russians are historically and presently deeply opposed to inspection on their territory, and that we run great danger that arms agreements without inspection may become increasingly difficult to make and even, perhaps, dangerous to rely on.

Is this a valid point that ought to be brought up?

Dr. KILLIAN. I would be rather inclined to agree, yes. There are two ways. It is going to be increasingly difficult without inspection to get the intelligence that one needs or the information one needs and, too, the increasing complexity of weapons is going to make it increasingly difficult to negotiate.

Dr. YORK. The complexity is a major issue. We all recall the first ICBMs, which were above the ground, which one could easily find, and we all know now they are deep in holes which makes them more difficult to find. Bombers which were the mainstays of our strategic force required airfields easy to find.

The complexity is leading very much in the direction of making arms control much more difficult.

Senator CASE. Mobility of weapons, for example, would be another factor.

Dr. YORK. Yes.

Senator GORE. And Dr. Killian suggested the possibility of further hardening missile sites, too, as an alternative to deployment.

Dr. KILLIAN. Yes, this is a program, I take it, well formulated.

Dr. YORK. Yes, superhardening programs.

Senator GORE. This may be more economical, both more economical and effective, but the committee will go into that later.

It is now 12:30, and the chairman would like to close the hearing first by inviting you to lunch.

Secondly, to announce the schedule for next Thursday. The subcommittee will hear Professor Marshall Shulman of Columbia, and Professor Allen Whiting of Michigan, and Dr. Carl Kaysen of the Institute for Advanced Study at Princeton.

The subcommittee thanks you. I would like to just close by saying this: if I could select one hearing from my 30 years service that I would like my son to listen to for information and inspiration, I would select this one.

Thank you very much.

Senator FULBRIGHT. Thank you very much.

(Whereupon, at 12:30 p.m., the subcommittee adjourned to reconvene at 10 a.m. Thursday, March 13.)

STRATEGIC AND FOREIGN POLICY IMPLICATIONS OF ABM SYSTEMS

THURSDAY, MARCH 13, 1969

UNITED STATES SENATE,
SUBCOMMITTEE ON INTERNATIONAL ORGANIZATION
AND DISARMAMENT AFFAIRS OF THE
COMMITTEE ON FOREIGN RELATIONS,
Washington, D.C.

The subcommittee met, pursuant to recess, at 10:05 a.m., in room 4221, New Senate Office Building, Senator Albert Gore (chairman of the subcommittee) presiding.

Present: Senators Gore, Fulbright (chairman of the full committee), Church, Symington, Pell, Case, Cooper, and Javits.

Senator GORE. The subcommittee will come to order.

The Subcommittee on International Organization and Disarmament Affairs continues its hearings today on the strategic and foreign policy implications of anti-ballistic-missile systems.

It is and has been the intent of the subcommittee to provide a forum for a fair and objective discussion of both the possible strengths, weaknesses, and implications of any deployment of anti-ballistic-missile systems.

ADMINISTRATION WITNESSES INVITED

The subcommittee sought to receive its first testimony from the Defense Department on the anti-ballistic-missile system. Dr. John Foster and General Starbird were invited to be our first witnesses to give the administration's case for the Sentinel system. The Defense Department preferred and requested to appear after President Nixon had reached his own decision and recommendation on the issue. The subcommittee acceded to this request and in a conversation with Secretary Laird it was agreed that the Secretary would appear before the subcommittee on March 20, which date was later changed by agreement to March 21. Thereupon, the subcommittee chairman invited the Honorable Gerard Smith, Director of the Arms Control and Disarmament Agency and a participant in the National Security Council on this issue, to be the first witness. He was followed by a panel of three scientists: Dr. Daniel Fink, Dr. Hans A. Bethe, and Dr. J. P. Ruina.

Drs. York, Kistiakowsky, and Killian were invited to appear on Tuesday, not because they had a particular view on the ABM issue, but because they were former Presidential science advisers. As a matter of fact, I have not discussed the issue with either of them.

The subcommittee cannot bear the responsibility for the near unanimity of their views. I might note in this connection that the subcommittee is unable to find a former Presidential science adviser who advocates the deployment of the ABM system.

I would like to have placed in the record a statement by Dr. Jerome Wiesner, on the ABM issue, which is contained in a Meet the Press interview.

(The statement referred to appears on p. 424 of the appendix.)

TELEGRAM FROM FORMER JOHNSON SCIENCE ADVISER

Today I have, unsolicited, a telegram addressed jointly to me and to Senator Cooper from Dr. Donald F. Hornig, science adviser to President Johnson, which I would like to read:

During my five years as Science Adviser to President Johnson I studied, with the aid of distinguished consultants, the question of ABM systems, their technical capabilities and their relations to our overall strategic position. I came to the conclusion then and believe now that the deployment of any of the proposed ABM systems would impair the security of the United States and retard progress toward a stable, peaceful world.

I can see no necessity for the deployment of a system to protect us from the Chinese. If our ICBM, Polaris and bomber forces are adequate to deter the Soviet Union, which possesses very large nuclear forces of its own the deterrent against China is overwhelming for the foreseeable future.

As for an ABM defense against the Soviet Union, there is no present prospect of a defense which could stop a large scale attack. Any system which I have examined was vulnerable in various respects, and in any case could be relatively easily countered by new developments in offensive weapons and tactics.

ABM systems cannot be considered in isolation. They would become part of an offense-defense game in which, at present, the offense seems to have the advantage. In any case, whatever initial system we deploy would have to be constantly elaborated and improved and eventually replaced by newer generation of ABM systems as the other side increased the quantity and quality of its offensive forces. This it would inevitably do if the ABM system had any effectiveness so that even the cost of the so-called full system would only be a down payment on the eventual expense. More important still, it would lead to continual escalation in the armament level of both sides with no increase in security. Indeed, if one reflects that in the face of a stronger Soviet force we would rely on a fantastically complicated system which could never be tested full scale and whose overall reliability would never be known, I believe that our security would decrease.

In my view the question of whether we would be defended better with or without an ABM system can only be answered by considering our overall strategic situation. Since so much is at stake this should be reviewed free from historical or partisan bias or vested interest. For this reason, I support the proposal by Dr. Killian that a broadly based national commission be created to study the total problem.

I digress to say that I introduced such a resolution in the Senate after Dr. Killian's testimony the other day, and Senator Percy asked to be added as a cosponsor.

At this time I believe deployment of ABM would be contrary to the national interest and might well impede what I consider the most urgent business, to get on with talks aimed at the possibility of limiting the further expansion of nuclear armaments.

Donald F. Hornig, 1 Huxley Lane, Pittsford, New York.

(The telegram follows:)

PITTSFORD, N.Y., *March 13, 1969.*

Senators ALBERT GORE and JOHN SHERMAN COOPER,
Subcommittee on Disarmament, Foreign Relations Committee,
Old Senate Office Building, Washington, D.C.:

During my five years as science advisor to President Johnson I studied, with the aid of distinguished consultants, the question of ABM systems, their technical capabilities and their relations to our overall strategic position. I came to the conclusion then and believe now that the deployment of any of the proposed ABM systems would impair the security of the United States and retard progress toward a stable, peaceful world.

I can see no necessity for the deployment of a sytem to protect us from the Chinese. If our ICBM, Polaris and bomber forces are adequate to deter the Soviet Union, which possesses very large nuclear forces of its own, the deterrent against China is overwhelming for the forseeable future.

As for an ABM defense against the Soviet Union, there is no present prospect of a defense which could stop a large scale attack. Any system which I have examined was vulnerable in various respects, and in any case could be relatively easily countered by new developments in offensive weapons and tactics.

ABM systems cannot be considered in isolation they would become part of an offense-defense game in which, at present, the offense seems to have the advantage. In any case, whatever initial system we deploy would have to be constantly elaborated and improved and eventually replaced by newer generation of ABM systems as the other side increased the quantity and quality of its offensive forces. This it would inevitably do if the ABM system had any effectiveness so that even the cost of the so-called full system would only be a down payment on the eventual expense. More important still, it would lead to continual escalation in the armament level of both sides with no increase in security. Indeed, if one reflects that in the face of a stronger Soviet force we would rely on a fantastically complicated system which could never be tested full scale and whose overall reliability would never be known, I believe that our security would decrease.

In my view the question of whether we would be defended better with or without an ABM system can only be answered by considering our overall strategic situation. Since so much is at stake this should be reviewed free from historical or partisan bias or vested interest. For this reason I support the proposal by Doctor Killian that a broadly based national commission be created to study the total problem.

At this time I believe deployment of ABM would be contrary to the national interest and might well impede what I consider the most urgent business, to get on with talks aimed at the possibility of limiting the further expansion of nuclear armaments.

DONALD F. HORNIG.

Senator GORE. The subcommittee next week will hear from Dr. Donald Brennan of the Hudson Institute who is, I understand, a strong advocate of deployment of the antiballistic missile system. After the testimony from Secretary of Defense Laird next week, the subcommittee may wish to hear additional witnesses.

We are fortunate, today, in having Prof. Marshall D. Shulman, of Columbia University, a scholar in the field of Russian history, traditions and historic attitudes; Professor Allen Whiting, of the University of Michigan, a student of Chinese history and culture; and Dr. Carl Kaysen, director of the Institute for Advanced Study at Princeton and former assistant to President Kennedy on international security affairs. Biographic information on each witness will be inserted in the record at the beginning of their testimony.

We will begin today with Professor Shulman. I suggest that Drs. Shulman, Whiting, and Kaysen sit together at the witness table, each giving an initial statement and then, if they are willing, responding as a panel to the questions of the subcommittee.

Thank you, gentlemen.

Dr. Shulman?

(A biographic sketch follows:)

BIOGRAPHIC SKETCH OF MARSHALL D. SHULMAN

Born: April 8, 1916, Jersey City, New Jersey.

Education: University of Michigan, A.B., 1937; Harvard University, student, 1939–1940; Columbia University, M.A., 1948; Russian Institute, Certificate, 1948; Columbia University, Ph.D., 1959.

Experience: 1937–38; Newspaper reporter, Detroit News. 1938–39: Writer, National Safety Council. 1940–42: Vice-President, Council for Democracy. 1942–46: U.S. Army Air Force (Private to Captain): glider pilot, psychological war-

fare officer. Decorated: Bronze Star; 1949–50: Information officer, U.S. Mission to the UN; 1950–53: Special assistant to Secretary of State; 1954–62: Associate Director, Russian Research Center, Harvard; 1956–60: Lecturer, Department of Government, Harvard; 1962–67: Research associate, Harvard; 1961–67: Professor, International politics, Fletcher School of Law and Diplomacy; 1963–64: Visiting research scholar, Carnegie Institute; 1967——: Professor, Government; Director, Russian Institute, Columbia University.

Awards and Memberships: Recipient, Rockefeller Public Service Award, 1953–54. Fellow, American Academy of Arts and Sciences; Member, International Political Science Association.

Research and Publications: Author: Stalin's Foreign Policy Reappraised, 1963; Beyond the Cold War, 1966.

Address: 622 W. 113th St., New York City, 10025.

STATEMENT OF DR. MARSHALL D. SHULMAN, PROFESSOR OF GOVERNMENT AND DIRECTOR, RUSSIAN INSTITUTE, COLUMBIA UNIVERSITY

Dr. SHULMAN. Thank you, Mr. Chairman.

I address myself, Mr. Chairman, to some international political aspects of the question, whether the United States should now deploy some form of antiballistic missile system, and in particular, I would like to suggest how I believe this decision affects, and is affected by, our relations with the Soviet Union.

I am not competent to testify regarding the technical aspects of the question, but I think it is evident that the matter is by no means a purely technical one, and that even if the question of technical feasibility were wholly satisfied, the political context in which this decision is made deserves serious consideration.

INTERACTION BETWEEN SOVIET UNION AND UNITED STATES

In the course of the public discussion of this question, there is no disagreement, I believe, that the central issue is how best to strengthen the security of the United States. The disagreements arise over how to think about security, in the light of the new conditions now prevailing, involving a complex and rapidly changing weapons technology, and an intricate process of interaction between the Soviet Union and the United States, whose policies are deeply influenced in both cases, although, in different ways by the interplay of political and social forces which we do not yet understand very well.

My testimony is divided into two parts: "Background and Recommendations."

BACKGROUND—MILITARY RELATIONSHIP

1. Background—I have here a series of points. The first one is this, Mr. Chairman:

Until a few years ago, the strategic military relationship of the Soviet Union and the United States had reached a plateau of relative stability, based upon a gross balance of mutual deterrence, despite considerable disparities between the two arsenals. Experience had taught both countries a considerable measure of sobriety, and in practice there developed significant tacit restraints which introduced some measure of stability in their strategic military competition. However, the question for superiority by each country and the appearance of a new generation of technological innovations now threaten to under-

mine that tenuous stability. From the Soviet point of view, the United States has by and large appeared to be the pacesetter, and the Soviet Union has been making a strenuous effort in recent years to catch up. Both countries are now in the grip of technological possibilities—improved accuracy, more target information from reconnaissance satellite photography, greater range and yield, multiple-guided warheads, advanced computer technology, and potential military uses of outer space and the seabed—which call into question the relative invulnerability of the retaliatory deterrence on which the previous stability was based. This circumstance is an important part of the context within which the ABM question arises.

INTERPLAY OF FORCES ON DECISIONMAKING PROCESS

2. There has been a spiral of interaction between the two countries, which stems partly from the fact that strategic policy is often determined by bureaucratic politics and psychological apprehensions, with rational doctrine coming along as an afterthought. The interplay of forces and interests operating on the decisionmaking process within each country is affected by that on the other side, with the result that a reciprocal process of stimulation has sometimes been set in motion. However, there is often a lag in time involved, during which ideas are diffused and sink in and get translated into action by cumbersome bureaucratic processes, with the result that we have often not recognized a reaction for what it is, but have taken it as a new initiative, reflecting a change in intentions. For example it appears probable to me that the increased rate of intercontinental missile deployment by the Soviet Union of which we became aware a few years ago may reflect a decision taken in response to the steep rate of increase in our missile program foreshadowed in the 1961 U.S. budget, which was in turn a response to our estimate of what the Soviet missile program of 1958 might have projected.

COMMUNIST PARTY DOMINATION BY ORTHODOX WING

3. Soviet policy in the present period, particularly as it affects domestic and Eastern European developments, appears to be dominated by the orthodox wing of the Communist Party bureaucracy, and is marked by a preoccupation with ideological conformity among intellectuals, artists, and nationality groups. While some of the social tensions stem from factors that also appear in the United States and elsewhere in the world, the modernization of the economy within the Soviet Union and in Eastern Europe raises special and difficult questions for a centralized system of party governance, and this may in part be responsible for the present tightening of ideological control. If there should be a relaxation of the level of tension with the United States, it is quite possible that this will be accompanied, as has been the case at times in the past, by a further tightening of police and party vigilance against "contamination by bourgeois ideology."

At least that may be its short-term effect. The long-term effect of this relaxation of tension might be different, hopefully. However, the Soviet effort to increase its influence in areas where U.S. influence has receded, as in the Middle East, sets limits on the degree of détente that can be expected in the present period.

SOVIET CONCERN ABOUT ECONOMIC COSTS

4. Among the considerations which weigh heavily upon the Soviet leadership in the present period, as it faces the problem of drafting a 5-year plan for the allocation of resources for the period 1971–75, is the drain on resources generally and upon advanced technology in particular as it contemplates the upward spiral of the strategic arms race. One year ago at this time, the Soviet leadership was engaged in a hard-fought debate, whether to enter into talks with the United States to damp down the strategic arms race. By the late spring of 1968, this issue was settled in favor of entering into such talks. We do not know what coalition of interests may have carried this decision or how far this coalition would be prepared to go in actual negotiations—it may be that the only agreement reached at that time was to let the talks begin—but it does appear to be the case that a serious concern about economic costs has been an important factor in impelling the Soviet leadership to want to find out how far the United States is prepared to go in checking the upward spiral of the strategic arms race.

HOPEFUL ATTITUDE TOWARD UNITED STATES

5. As of this moment, the Soviet attitude toward the new American administration is tentatively hopeful, with many reservations in the background. Despite its past feelings about the new President, and its anxieties about pressures it sees toward the militarization of the American society, the Soviet press and leadership appear to believe that "objective circumstances"—meaning domestic social tensions in the United States, budgetary pressures, and the pacific inclination of the American people—together with the practicality of the President may create a present opportunity for moderating the strategic arms race in some measure.

RISING HOSTILITY BETWEEN CHINA AND SOVIET UNION

6. The rise in publicized hostility between the Soviet Union and Communist China is a factor that may operate in several contradictory directions. The Soviet Union has clearly been anxious about the possibility of an alliance between China and the United States, however remote that prospect now appears to us; I do not, however, see the possibility of a Soviet alliance with the United States against China in view of the intensity of the residual hostilities in our relationship. Nevertheless, some quiescence in its relations with the United States may seem attractive in a period of intensified conflict on the Chinese border. On the other hand, this conflict, also, catalytically increases Soviet interest in defense, and sets limits on the possibilities for overt collaboration with the United States.

SOVIET ATTITUDE TOWARD U.S. ABM DEPLOYMENT

7. Soviet thinking about the significance of ABM may have gone through changes with time. The original deployment decision appeared to be something of a "politician's compromise" among conflicting pressures, and it corresponded to a folk-wisdom feeling about the defense of Moscow. Over time, however, the decision seems to have been weakened by a growing realization of the ineffectiveness of

that particular system and its stimulating effect upon the U.S. strategic budget. In recent years, serious analytical writing on the ABM in military doctrine has dropped out of the public press. With regard to the U.S. decision to deploy Sentinel, the Soviet press has not until recently expressed deep concern, except for the worry that a thin ABM system might soon put on more weight. Although, evidence is lacking, I believe the ABM by itself may be of less concern than the ABM in its context, which includes the deployment of MIRVs and other technological developments previously mentioned, especially the improvement of missile accuracy. Taken together, these may seem to give some plausibility to the arguments of those who claim the United States is bent on achieving a first-strike capability. The Soviet response could be expected both on the psychological level and on the level of military strategy—as was our response to the Soviet ABM—and would involve the acceleration of technological innovations which would, in turn, lead to a further American response.

RECOMMENDATIONS—CONTINUATION OF R. AND D.

I come to part II, Mr. Chairman, "Recommendations."

With this background in mind, I find myself impelled to the following conclusions:

1. In the absence of a compelling case for the immediate deployment of an ABM, and a persuasive case for the feasibility of the proposed system, I believe that any such deployment should be put on "hold" at the present time, while continuing our research and development on various antiballistic missile systems. There are risks and costs to such deferment, but I believe they are less than the risks and costs of stimulating a continuation of the upward spiral of the strategic arms race, and delaying a possible agreement with the Soviet Union until it becomes even more difficult to achieve than it would be today.

START OF NEGOTIATIONS

2. Even more important, I believe, would be an effort on our part to begin the process of negotiations with the Soviet Union on the damping down of the strategic arms race as soon as possible, with a clear indication of the seriousness of our intentions to achieve stability, leveling off and, when possible, reductions. One essential mark of our seriousness would be a clear indication of our willingness to exercise restraint in the further deployment of Poseidon, Minuteman III, and other advanced offensive weapons. There are also risks to this course, but if our security is best advanced at this stage by a stable deterrent balance at a moderate level, the risks are neither disproportionate nor irretrievable.

AVOID EXPECTATIONS IN NEGOTIATIONS

3. I would recommend that we carefully avoid creating undue expectations for early and dramatic results in such negotiations. It seems likely that these talks may take a long time, that they may involve procedural wrangles and setbacks, and that they may at best produce tacit and reciprocal restraint rather than treaty agreements. We should

also remind ourselves that these talks are not likely to produce an across-the-board détente, nor to settle other important political differences.

TALKS SHOULD NOT DEPEND ON POLITICAL ISSUES

4. The administration should be commended for its effort to move ahead on a number of political issues with the Soviet Union, but the missile talks should not depend upon the successful outcome of these efforts. It is evident that progress in the missile talks would be difficult if the Soviet Union sought to gain political advantage from the climate created by the fact of the talks themselves, or if the Soviet Union were actively fanning the sparks in the Middle East, or if the United States were engaged in bombing North Vietnam. But the point should be clearly established that there is an overlapping interest on the part of the Soviet Union and the United States equally in leveling off the strategic arms race, even though the political rivalry between the two countries is not now substantially abated, as it may not be for some time.

OUR BARGAINING POSITION

5. It follows, also, Mr. Chairman, that it would not be wise to deploy an ABM system in the belief that it would improve our bargaining position in relation to the missile talks. To do so would be more likely, in my opinion, to strengthen the position of those on the Soviet side who are only too ready to argue that the United States is too committed by its system or its pressure groups to an arms race to be seriously interested in its abatement.

MODERATE LEVEL OF ABM PROTECTION

6. I would not argue that every level of antiballistic missile deployment under every circumstance is necessarily destabilizing. I can conceive of circumstances arising in the course of these negotiations in which the Soviet Union might indicate it would not wish to contemplate the dismantling of its ABM installations. It could then accept with equanimity some moderate level of ABM protection for the invulnerability of our fixed-site missiles, our command and control installations and our Strategic Air Force, as a stabilizing factor in the deterrent balance. In such a case, I would think it important that both by Presidential declaration and by the physical disposition of these facilities, it should be made clear that they will not be used as building blocks toward a thick ABM system for the defense of cities, thus degrading the Soviet deterrent. In such a circumstance, progress in the missile talks and restraint in the deployment of advanced offensive weapons would be necessary concomitants to these deployments.

Finally, Mr. Chairman, I would urge that we never lose sight of our longer term objective to work our way out from under the balance of terror, toward agreed reductions in strategic weapons as these become possible, and toward at least tentative first steps to forms of security that need not hold our people in precarious hostage.

Thank you, Mr. Chairman.

Senator GORE. Thank you, Dr. Shulman, for an erudite, scholarly, reasoned statement.

Dr. Whiting?

(A biographic sketch follows:)

BIOGRAPHIC SKETCH OF ALLEN SUESS WHITING

Born: October 27, 1926, Perth Amboy, New Jersey.

Education: Cornell University, A.B., 1948; Columbia University, M.A., 1950; Columbia University, Russian Institute Certificate, 1950; Columbia University, Ph.D., 1952.

Experience: 1945: U.S. Army; 1951–53: Instructor, political science, Northwestern University; 1953–55: Ford Foundation fellow, Taiwan, Hong Kong, Japan; 1955–57: Assistant professor, political science, Michigan State University; 1957–61: Staff member, Social Science Division, Rand Corporation; 1960: Visiting associate professor, Columbia University; 1961–62; Intelligence Research Specialist and Senior member, Special Studies Group, Department of State; 1962–66: Director, Office of Research and Analysis for the Far East, Department of State; 1966–68: Deputy Principal Officer, American Consulate-General, Hong Kong; 1968——: Professor of political science, University of Michigan.

Member: American Political Science Association; Association of Asian Studies; American Slavic Association; Phi Beta Kappa.

Publications: China crosses the Yalu, 1960; Soviet policies in China, 1917–1924, 1954. Co-author: Sinkiang: pawn or pivot? 1958; Dynamics of international relations, 1956.

Address: Department of Political Science, University of Michigan, Ann Arbor, Michigan 48104.

STATEMENT OF DR. ALLEN S. WHITING, PROFESSOR OF POLITICAL SCIENCE AND ASSOCIATE, CENTER FOR CHINESE STUDIES, THE UNIVERSITY OF MICHIGAN

Dr. WHITING. Mr. Chairman, unlike Professor Shulman, I can lay no claim to firsthand contact with the elements of Communist Chinese leadership and people. But 20 years of analyzing the People's Republic of China in action does give a basis for evaluating the claim that an antiballistic missile system is necessary to cope with the alleged "Chinese threat." In addition to past Chinese behavior, we can develop a logical framework of likely future contingencies within which we can estimate the range of probable Chinese actions. And, finally, I would like to offer some thoughts on how our construction of an ABM, officially justified in terms of a "Chinese threat," might affect our future relations with China.

PREMISES UNDERLYING CHINA-ORIENTED ABM

There appear to be two alternative premises underlying the rationale which links an ABM with China's anticipated ICBM capability, estimated to be available to Peking in the next 4 or 5 years. One premise holds that the Chinese leadership at that time—quite likely after the death of Mao Tse-tung—may be sufficiently irrational as to launch a thermonuclear attack against American cities, despite the absolute certainty of retaliatory nuclear devastation in China. An alternative premise holds that our confrontation with China in situations of mutual but conflicting interests will be sufficiently serious as to require an ABM to safeguard against the possibility of miscalculation, escalation, and a sudden—if suicidal—Chinese ICBM attack.

Both premises share an assumption that the Chinese will be fundamentally different from the Russians in their handling of nuclear weapons and their response to the threat of nuclear devastation. We have lived for many years with several generations of Soviet weapons

systems capable of striking American cities. We have actually faced down the Russians in Berlin and Cuba. We have found that Soviet doctrine and American deterrence worked. No Russian attack occurred. In the Western Pacific theater we have deployed and can deploy so vast an arsenal of nuclear weapons in land, sea, and airborne systems, as to literally destroy much of China's population and virtually all of its agricultural as well as its industrial economy. And yet we are asked to believe that unless we have an antiballistic missile system, we are in serious jeopardy should China acquire an intercontinental ballistic missile system.

CHINESE AGGRESSION

I see no basis in fact or theory for attributing a significantly higher likelihood of irrationality to Chinese as compared with Russian decisionmakers. To be sure, the Chinese are far more strident than the Russians in verbal support of so-called people's wars and national liberation struggles. But Peking has done no more than Moscow in rendering open aggressive support for foreign insurgencies, much less in risking nuclear retaliation on behalf of such insurrections. Despite our continued intervention in the Chinese civil war, protecting Chinese Nationalist forces on Quemoy within gun range of Chinese Communist batteries on the mainland, there has been no compulsive or reckless risktaking on the part of Peking. True, Chinese Communist forces engaged us massively in the Korean war while Russia stood aside. However, an American military move in Hungary in 1956 or Czechoslovakia in 1968 would almost certainly have found Moscow taking risks similar to, if not greater than, Peking took in Korea. The Chinese gave no help to the North Korean invasion in 1950 but did intervene when that regime was about to be driven off its own territory. Any similar effort to roll back Communist rule in East Europe would have run an equally grave risk of provoking an identical—or worse—Russian reaction.

Since the Korean war, the only major action involving Chinese troops has been the several weeks of limited war with India in the disputed Himalayan border area. Indeed, the preponderant weight of evidence shows that the Chinese leadership to date has used force beyond its borders with a consistently deliberate control so as to minimize the risks consonant with the perceived interests involved. This rational behavior seems to be at least as equally, if not more, likely in the post-Mao regime of the mid-1970s.

CHINESE MISCALCULATION

The alternative premise postulates a situation wherein the Chinese leadership acts rationally but miscalculates, and suddenly finds itself compelled to launch an ICBM attack against American cities regardless of the consequences. This could arise from one of two situations. Peking attempts nuclear blackmail, its bluff is called, and it is "locked in" to a situation from which it sees no alternative but to proceed. Alternatively, Chinese interaction, political or military, with the United States or its allies, reaches a point which threatens a nuclear attack on China and Peking feels it must preempt or lose its small, highly vulnerable ICBM force to enemy attack.

These hypothetical projections cannot be assessed *in vacuo*, however. They must be applied to specific situations, past, present, or future, so as to assess their likelihood. Blackmail must have a purpose; confrontations must offer credible gains as well as credible risks. For instance, the most familiar aspect of Chinese Communist propaganda is Peking's avowed support for the "people's wars." However, to make this a plausible basis for projecting a Chinese nuclear attack against the United States, we must go well beyond simple patronage, whether public or private, for insurgency. We must hypothesize serious, direct, and overt material Chinese support sufficient to identify an insurgency as of vital interest to Peking—so vital as to risk the entire Chinese mainland suffering nuclear devastation.

CHINA'S BORDER DISPUTES

Between 1949 and 1969 not one such insurgency has arisen, either on China's borders or at more distant points overseas. Despite a serious border dispute with New Delhi, one which eventually triggered actual war in 1962, Peking has not given massive support nor taken significant risks on behalf of Indian Communist insurrectionary movements or anti-Indian minority uprisings. The Telangana uprising in 1949 failed as did the Naxalbari revolt in 1968. Both applied Mao's maxims of armed struggle in the countryside. Both times Peking anathematized New Delhi as a fascist regime, acting as an anti-Chinese tool for foreign governments. Yet China never took any serious steps to keep these insurgencies alive, much less see them through to victory.

Similarly anti-Indian movements or actual uprisings, in the sub-Himalayan states and principalities of Nepal, Bhutan, and Sikkim, or amongst the Nagas of Assam, have failed to win significant Chinese aid. Incitement and subversion may be attempted through propaganda and, to a modest extent, through money, arms, and training as well. Beyond this, however, Peking refuses to go. This pattern has remained fairly constant, despite the heightened militancy associated with China's cultural revolution.

BURMA AND THAILAND

Equally relevant is the low degree of Chinese involvement in Burma's various insurgencies, both Communist and those of national minorities. At no time since 1949 has the Rangoon regime been able to pacify the entire country. Much of the territory adjacent to China has been controlled by various armed groups hostile to Rangoon's rule. As in India, Peking's patronage, both overt and covert, encourages and equips Communist insurrectionists and anti-Burmese separatists. Yet neither the amount nor the kind of such aid has seriously threatened the regime. The situation has ebbed and flowed and today seems no worse than in the past, at least in terms of Chinese involvement.

Thailand, of course, has won considerable attention as a public target of Peking's propaganda. Over the past few years actual armed insurrection has spread through provinces in the north, northeast, and southern sectors of Thailand. Most recently Mao revolts have further challenged Bangkok's authority. Some support for these various in-

surgencies comes from Hanoi; most comes from Peking. Defectors provide graphic evidence of training and direction from Chinese sources on the mainland and in Thailand. Presumably China could easily infiltrate a well-trained guerrilla force that would be wholly Thai in composition recruited from the 200,000 ethnic Thais in the nearby Chinese province of Yunnan. However, the present insurgents remain a scattered, poorly equipped, uncoordinated force of less than 2,000. This small effort is what lies behind Peking radio's grandiose claims for "people's war" in Thailand.

In short, after 20 years of these unstable situations on the unpoliced borders of a nation with 600 or 700 million people who supposedly support armed struggles abroad, we must ask: What has kept China from doing more? Has it been the fear of U.S. retaliation? This could hardly apply in remote Nagaland or amongst the hill peoples of neutralist Burma. Chinese troops or an indigenous fifth column could march into adjacent territory with overwhelming force and establish a "liberated area" without fear of U.S. power being unleashed against the Chinese mainland. Moreover, where China's interests have been seen by Peking as truly vital, such risks of U.S. retaliation have been taken—overtly in Korea, and covertly in Vietnam.

PEKING ATTITUDE TOWARD FOREIGN REVOLUTIONARY MOVEMENTS

Thus by focusing less on Peking's words and more on Peking's actions, we can separate out the lesser from the greater Chinese interests. Clearly the Peking leadership does not believe its vital interests include giving significant material support to foreign revolutionary movements. In fact, Mao's doctrine explicitly describes national liberation struggles as essentially dependent on local resources, a "do it yourself" philosophy. This doctrine serves Chinese ethnocentric and practical interests as well. First, it points to the Chinese as the models for guerrilla warfare and prolonged struggle without outside help. The message is clear: "we did it basically on our own; you can too." Second, China's practical interests are served because this general doctrine excludes the necessity of choosing between safe and unsafe situations in allocating Chinese assistance. All "people's wars" will be treated equally; no risks will be taken because no Chinese aid will be that important. This is the constant in Chinese policy, whether with neutral Burma, hostile India, or American-allied Thailand.

I see no plausible reason for these Chinese calculations to change 5 years hence. Neither in the first flush of victory in 1949 nor in Mao's last political convulsions during the cultural revolution did Chinese armies move across borders on behalf of "people's wars." Mao's successors are unlikely to react any differently to the role China should play in advancing communism abroad. They might conceivably scale down their lip service to "national liberation struggles," although if the Soviet precedent serves any example, we should not expect this to happen for many years to come. But certainly there is no reason to believe they will take greater risks in staking their prestige, and possibly their country, behind a local insurgency through a show of force or nuclear blackmail.

PLAUSIBILITY OF CHINESE NUCLEAR BLACKMAIL

Indeed, were one to concede any plausibility to this basis for Chinese nuclear blackmail, it would have far more relevance to Chinese deployment of an intermediate range ballistic missile system, targeted against U.S. bases on China's periphery and against cities of our allies. A Chinese ICBM and a U.S.-based ABM would be largely irrelevant to a serious and systematic effort by Peking to back local insurgencies with nuclear force. But even the IRBM [intermediate-range ballistic missile] alternative assumes so fundamental a change in Chinese doctrine as to raise serious questions of probability.

Moreover, so long as U.S. nuclear power remains capable of devastating China, the credibility of any such blackmail—whether through ICBMs or IRBMs—is so low as to, in all likelihood, discourage its use by Peking. If we assume a burgeoning nuclear missile program in China, we also assume the concomitant infrastructure of technological modernization and all that is entailed in supporting so costly and complicated a military system. This developmental process has a double effect. First, it educates an elite in the long and painful process of pulling a backward country somewhere near the levels of advanced nations. Moreover it increases the vulnerability of their society, no longer dependent on scattered ricefields but now locked into the urban complex, to nuclear attack. In short, China's acquisition of an operational nuclear missile capability should reduce, not increase, the willingness of Peking to risk nuclear war.

CONVENTIONAL TYPES OF CONFLICT

If we shift from so-called "people's wars" to conventional types of conflict, the past 20 years give far more cause for concern in projecting the future. The important uses of Chinese force, with varying degrees of anticipated risk, occurred in Korea, 1950–53; Quemoy, 1954–55 and 1958; India, 1962 and 1965; and Vietnam, 1965–68. Several characteristics link these events together. Every clash occurred in immediate proximity to, if not actually on, China's border. In every case Peking regulated the level and tempo of its military actions so as to minimize the risk of escalation spilling over into China, although accepting some such risk as basically unavoidable. After Korea, Peking never again openly courted U.S. attack against the mainland. On the contrary, it very carefully controlled its actions in the Taiwan Strait crises, and its words in the Vietnam war, so as to avoid provoking us to use either conventional or nuclear force against targets in China.

Looking at the specific issues involved in each clash, these events obviously differ, one from another. The first Sino-Indian conflict in 1962 grew out of a festering border dispute, complicated by Chinese assumptions of foreign exploitation of internal vulnerabilities in the disastrous aftermath of Mao's Great Leap Forward. However, China's attack in 1965 was part of the Pak-Indian conflict within which Peking had a limited interest on behalf of Pakistan as well as itself. In both Korea and Vietnam, Chinese assistance came on behalf of a beseiged neighbor with a common Communist ideology against a commonly perceived enemy, U.S. imperialism. Finally, the two Quemoy crises arose

in the context of China's unfinished civil war into which we interposed our force 19 years ago and from which we have never disengaged.

One can examine this record much as one looks at the doughnut or the hole. On the one hand, it shows the careful deliberation behind China's use of force in conventional situations commonly encountered in international relations over the past 200 years. This is the way nations behave, Communist or not, Chinese or not. On the other hand, it does show Peking's willingness to take risks and to use its force in situations other than clear and immediate self-defense.

I would suggest that combining both points of emphasis permits us to project a situation when China acquires nuclear weapons which is neither wholly reassuring nor wholly frightening. I suspect this is true for many nations who now have or will acquire nuclear weapons.

U.S. INTERVENTION IN CHINESE CIVIL WAR

There is one aspect of the Chinese sitaution, however, which is unique compared with our relationship to other nuclear powers: we did intervene and continue to intervene in the Chinese civil war. Moreover, in the second Quemoy crisis of 1958, we provided the Chinese Nationalist forces with 8-inch howitzers publicly identified as capable of firing nuclear shells. Aside from whatever role our threats to use nuclear weapons in 1953 may have played in bringing about a truce in Korea, our nuclear deployment in the West Pacific has taken on a particular salience for Peking because it has provided the ultimate deterrent against Mao's pursuit to the end of his more than 30 years of struggle with Chiang Kai-shek.

U.S. DETERMINATION TO MAINTAIN MILITARY SUPERORITY SUSPECTED

Here a bit of historical perspective is in order. For more than 100 years, China—long confident of its civilization's superiority to the outside world—suffered invasion and exploitation by foreign powers, large and small, European and Asian, largely because of China's material inferiority, especially in weapons. We call this gunboat diplomacy. Chinese—whether Nationalist or Communist—call it the period of unequal treaties and foreign imperialism. Peking's determination to gain sufficient military strength to prevent foreign interference in China's internal affairs made the development of nuclear power in China absolutely essential. Whether against American dominance or Soviet dependence, China's nuclear capability would provide at least psychological and political strength, if not an actual strategic stabilizer and equalizer.

I do not doubt that significant elements in the Chinese leadership—certainly Mao himself—believed their explanation of former Secretary of Defense McNamara's announcement to build an ABM because of the Chinese threat. They interpret this as a step taken by U.S. imperialists to continue their nuclear blackmail and nuclear threats against China and another anti-Chinese measure adopted to intensify the administration's collusion with the Soviet revisionist leading clique. If we continue with the ABM and its present justification, we will perpetuate the suspicion, if not the conviction, in Peking that we are determined to maintain maximum military superiority over China so as

to act at will in pursuit of our interests, regardless of the consequences for Peking. Given our confrontation over Taiwan and the offshore islands, anything which perpetuates or intensifies the sense of bitterness and frustration in the Chinese leadership must be justified as necessary on other grounds which offset this cost. Seen in this perspective, the antiballistice missile system is not a guarantee against Chinese irrationality or miscalculation but rather may actually be a further goad to Chinese assumptions of our malevolence and permanent enmity.

Thank you.

Senator GORE. Thank you, Dr. Whiting, for a very challenging and provocative statement.

The committee will now hear Dr. Kaysen.

(A biographic sketch follows:)

BIOGRAPHIC SKETCH OF CARL KAYSEN, NEW JERSEY

Born: March 5, 1920, Atlanta, Georgia.

Education: University of Pennsylvania, A.B., 1940; postgraduate work at Columbia, 1940–1942; Harvard University, M.A., 1947, Ph. D., 1954.

Experience: 1940–42: Researcher, National Bureau of Economic Research; 1942: Economist, Office of Strategic Services; 1942–45: Captain, Air Intelligence, U.S. Army; 1947–50: Junior fellow, Society of Fellows, Harvard University; 1950–55: Assistant professor, economics, Harvard; 1955–57: Associate professor, economics, Harvard; 1957–61: Professor, economics, Harvard; 1961–66: Associate dean, Graduate School of Public Administration, Harvard; 1966——: Director; senior professor, theoretical physics; Institute for Advanced Study, Princeton University; 1961–63: Consultant to White House and Bureau of Budget. Deputy special assistant to President Kennedy for national security affairs, consultant, Department of Defense, Department of Commerce, Civil Defense Administration, Department of Justice.

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STATEMENT OF DR. CARL KAYSEN, DIRECTOR OF THE INSTITUTE FOR ADVANCED STUDY, PRINCETON UNIVERSITY

Dr. KAYSEN. Mr. Chairman, and members of the committee, I am testifying here not as an expert on a particular country but as a student of military strategy, of military policy, and of the relation of military force to political goals, with some practical experience of these matters as well.

The question to which I am addressing myself is: Should the Government of the United States now go ahead with the proposed deployment of the Sentinel anti-ballistic-missile system?

This question in turn must be divided into two parts: First, whether the deployment that has recently been proposed should go forward—namely, that of a "thin" area defense over the whole country, relying primarily on the Spartan long-range, high-altitude interceptor missile but incorporating also a number of Sprint short-range, lower-altitude interceptors used mainly to defend the radar installations of the system—and the second alternative, whether there should be a modified deployment which would be designed primarily to defend Minuteman missile sites and bomber bases, but which would still contain a substantial element of area defense.

ABM DEPLOYMENT NOT ADVOCATED

My answer to the question is "No."

This response is based primarily on two propositions: First, we do not need such a deployment now to increase our security; second, since we don't need it, we must not do it because it is expensive and there are more pressing claims on our resources and efforts which merit higher priorities than a large new military system that is not strictly necessary.

Further, it is my judgment that the deployment of a Sentinel system in either of the modes described above is more likely to decrease than to increase our security. Agreement with this third proposition is not strictly necessary to a conclusion that a deployment decision is not now in order, but obviously it reinforces greatly the more narrowly based argument that rests on the first two propositions above.

ABM NOT NEEDED FOR SECURITY REASONS

My first proposition—that we do not need an ABM system now for security reasons—requires elaboration. The primary function of the large, complex strategic weapons systems we have built up over the last decade and a half is to insure that no adversary with a large strategic capability will be tempted to use it against us. Our present system does that by its capability to inflict a very high level of damage on even the largest and most powerful potential adversary—that is, the Soviet Union—after that adversary has made a surprise attack on us. In the face of that capability, such an attack would be irrational. This deterrent posture has been efficacious in the face of a large buildup in Soviet striking strength. The present size and disposition of our offensive forces and the associated intelligence, warning, command, and control systems, is such as to insure that they can continue to perform this function effectively in the near future, say the next 3 to 4 years. Whether they can do so in the further future is a different question to which I will return in a moment. The proposed ABM system will add little, if anything, to the capability of our forces to continue to perform this deterrent function. Their own performance, that is the ABM's own performance, is quite uncertain and their effect in adding to our large retaliatory capacity—what the Defense Department has come to call our capacity for assured destruction—is marginal at best if the system performs well and may be nil or even negative if it performs badly. You have already heard from scientists of great technical competence and experience on the complexities of the system and the difficulties of predicting its performance. Since I am neither a natural scientist nor engineer, I can add nothing from my own knowledge to what you have already heard. Further, the Soviet Union can readily take responsive measures in the way of adding to their offensive forces, improving the penetration capability of their reentry vehicles, and the like, which can be expected to overcome a very substantial part, if not all, of whatever defensive capability the ABM system possesses.

ABM'S DETERRENT FUNCTION

Second, as far as its supposed function of defense, in the event of nuclear war, the proposed system may have some value if the Soviets do nothing to respond to it. With the system we might sustain fewer casualties in the event of deterrence failing and war coming, than without it. However, we must remember that our primary reliance is and has been on deterrence, and that damage limitation is, and has been, at best a poor and weak second. In the past damage limitation has been argued for in somewhat inconsistent terms, partly as a kind of nearly free add-on to what were essentially deterrent forces, partly as a somewhat euphemistic way of describing something that was nearly but not quite a first-strike capability. Even separately, these arguments are not persuasive. Together they tend to be contradictory. They become no more effective when the mode of damage limitation is defensive rather than preemptive. Further, the more it appears that the system could achieve a significant defensive result, the more likely it is that the Soviets will respond to it in such a way as to negate most of its effect.

MUTUAL DETERRENCE

Soviet capabilities, both in terms of current deployments and development and production potential for improving and increasing them, are such as to make it impossible for our strategic forces to do much more for us than provide mutual deterrence. The existence of these forces, confronting large and similarly stable Soviet second-strike forces, does provide some general extra restraint on both powers in respect to any action which might lead to military involvements and the awful threat of escalation. However, even this restraint is imperfect, as the recent past has shown. However, it is clear to me, and I think to every other careful observer, that strategic striking power cannot now, has not in the recent past, and will not in the foreseeable future, offer the kind of military threat vis-a-vis the Soviet Union that is translatable into useful political power, precisely because the Soviet Union offers and can continue to offer the same kind of threat to us.

On the scale and in the mode originally proposed, the Sentinel system would simply make no essential difference in respect to our strategic relations with the Soviet Union as far as mutual deterrence goes, even if the Soviet Union does little to respond to its deployment. Of course, we cannot predict that they will not respond. If the system is deployed on a larger scale than is now proposed—that is, if the "thin" system grows up to a "thick" one—we must anticipate a Soviet response. It has never been our policy, and I think it never should be, to seek a first-strike capacity vis-a-vis the Soviet Union. If we were seeking such, and an ABM were big enough, reliable enough, and not capable of being effectively countered by Soviet response, then its deployment might indeed alter significantly the strategic balance. But none of these conditions holds.

RATIONALE FOR THIN AREA DEFENSE

The original rationale of Sentinel deployment and "thin" area defense to protect the whole country against a Chinese missile attack in the mid or late seventies was never convincing. It seems to have been

abandoned by its proponents. An attack on the United States by the strategically weak Chinese would be wildly irrational, as I think Mr. Whiting's excellent testimony has brought forth here. The United States has a first-strike capacity against China now. Are we seeking to extend it? To use it? Do we really believe that while we do deter the Soviets, we cannot deter the Chinese?

RATIONALE FOR MINUTEMAN DEFENSE

If the rationale for the deployment of Sentinel is shifted once again and becomes that of defending our bomber bases and Minuteman sites, we can say again, "It's not now needed." The survivability of a sufficient striking force of ours for effective deterrence is not in doubt now and does not appear likely to be in the near future. To the extent that in the further future, it becomes in doubt, the question of whether the Sentinel system, designed for quite another task, is the efficient mode for increasing that survivability deserves careful examination. For example, it is obviously cheaper, simpler and quicker to increase the survivability of the bomber force by spending the extra money required to increase the number of planes on air-alert or provide for a large number of additional bases, rather than to erect an elaborate missile system for close-in defense of bomber bases.

RISING COST OF SENTINEL SYSTEM

My second proposition hardly needs elaboration. Deployment of the Sentinel system as now proposed will cost us $5 to $10 billion over the next several years. The Senate needs no instruction on the variety of pressing needs for which these sums could be used. If, as I have argued above, Sentinel is not a necessity for our security, then there is every reason to seek higher priority uses for Federal funds. Not only is the money important, but the question of political effort and priority is also important. The question of how we value what may at best be a marginal addition to our defense in relation to what are clearly major urgent needs in domestic areas is deeply involved.

DEPLOYMENT WILL DETRACT FROM OUR SECURITY

In my own view, the argument goes beyond the two points that I have just made. A decision to begin now to deploy the Sentinel system will detract from our security, rather than add to it. The argument for this view is complex; it involves a further forecast into what is inevitably an uncertain future and includes an important element of judgment, but so, of course, do the arguments the other way. Forecasts and judgments cannot be escaped. The military technology embodied in the forces that we and the Soviet Union now have deployed is such as to make the maintenance of deterrent stability relatively secure. The nature of the forces is such that a would-be attacker can hardly entertain a belief in his ability to succeed. Further, each side has a clear notion of the forces which the other side commands. The next stages of the evolution of the technology of strategic weapons will change that situation in a drastically unfavorable way. The combination of ABM defense, MIRVs, and mobile missiles, toward which both sides appear to be moving, offers much less prospect of certainty and stability of deterrence. Our most urgent task in maintaining our security is to

insure the kind of arms control negotiations which have a good prospect of closing off movement in this direction, on both sides. An immediate decision to deploy will do nothing to help that process and may hinder it. It will stimulate forces both within our own governmental system and within the Soviet system that will push toward further radical changes in weapons.

It has been stated by some that, if we fail to deploy the ABM, we will be throwing away a bargaining card for negotiation with the Soviet Union. I simply cannot understand this argument. The future capacity to deploy, and perhaps to deploy a better conceived and designed system is all the bargaining card we need. Actual deployment, by revealing what we are doing, diminishes rather than increases the effectiveness of our bargaining position.

DO WEAPONS DICTATE POLICY?

Finally, there is an even larger and deeper issue. Do weapons dictate policy, or do we decide on the basis of our policy concepts what weapons we wish to deploy? As new and frightening technological possibilities open up before us, I think this is the most important question that the Senate, the Government, and the country must face.

Thank you.

Senator GORE. Dr. Kaysen, on behalf of the committee, I wish to thank you. I would like to say that I can identify and do identify with your statement more than any statement that has been given. In saying that, I don't wish to compliment you above the others, but acknowledge my own limitations. You take and you have taken information of experts and advice of experts and have applied logic and reason to arrive at conclusions. Your statement is very helpful.

On behalf of the subcommittee, I wish to thank each of you gentlemen. I will now recognize the distinguished chairman of the committee for interrogation of the panel.

Senator FULBRIGHT. Thank you, Mr. Chairman.

OBSERVATIONS FOR COUNTRY AS WHOLE

I would like to associate myself with what Senator Gore has said about all three of these statements. I know it is a great trouble to all three of you gentlemen to come here and to give us the benefit of your observations about this most critical matter. However, I am sure you realize you are not giving it just to this subcommittee, but to the country as a whole, and I am quite certain to the White House, where it is most important.

I find nothing that I can disagree with. I think some of the reasoning that is assembled here, as Senator Gore has said, by all three of you, but particularly by Dr. Kaysen, is extremely appealing.

Perhaps all I might do is to try to emphasize a few points.

The point you just emphasized at the very last of your paper, Mr. Kaysen, is extremely important. We become so bemused by the cost and magnitude of our armed services that we forget altogether what they are about or why we have them. We think since they cost so much, they must be important. Anything that involves $80 or $90 billion must be justified by some kind of reasoning; otherwise we are all fools.

So there is a great deal of effort put out to make it appear that this is all for some credible purpose. In your last paragraph, you raise, as you say, the most important question of all; I am not so sure it isn't.

WAR COLLEGE LECTURES

Dr. Whiting, you are very bold because you have challenged some of the most cherished myths of this city. The idea that the Chinese aren't absolutely and incurably aggressive against everybody is anathema to the basic principles of most people who have been running our Government, specifically some of the people who lecture for the military. That is the basic theme through all of their lectures. Have you ever seen any of these lectures?

Senator GORE. War College.

Dr. WHITING. Yes, sir; I have.

Senator FULBRIGHT. Is that not correct? Are not the assumptions of the aggressiveness of the Chinese together with the conspiratorial nature of the Communist movement fundamental to these lectures?

Dr. WHITING. I think they have been, sir, with the exception of certain lectures I have given at the War College. [Laughter.]

Senator FULBRIGHT. You gave a lecture to the War College?

Dr. WHITING. Yes, sir.

Senator FULBRIGHT. You have not been a member of the team which I think the War College sends around over the country to inform the American people about the nature of this challenge, have you?

Dr. WHITING. No, I have not.

Senator FULBRIGHT. Those are quite different things. I also gave a lecture once at the War College. [Laughter.]

But you are aware of the fact that the Industrial College, at least, for many years has organized what they call Blue Teams and Red Teams which are sent around the country to inform people about the nature of the Communist challenge. Are you familiar with those lectures?

Dr. WHITING. No, sir, I am not. I lived a sheltered life here in Washington for 5 years.

Senator FULBRIGHT. I find very few people in Washington who are familiar with them. When you go out into the provinces you hear about them. They have lectured in my State. They have found it part of their responsibilities to tell some of my constituents about the nature of the Communist challenge, and almost invariably it is that the Chinese are incurably aggressive. I would guess from your statement that you don't agree with that. Is that correct?

Dr. WHITING. That is correct.

Senator FULBRIGHT. They are about normal like other people, aren't they?

Dr. WHITING. Correct.

Senator FULBRIGHT. Is that a correct statement?

Dr. WHITING. Yes, sir, that is a fair statement.

CHINESE-SOVIET BORDER CLASH

Senator FULBRIGHT. It might be interesting, if you don't mind, to say a word about this recent clash between the Chinese and the Russians. Does this indicate aggression on the part of the Chinese or not?

Dr. WHITING. Well, sir, I have no information on any of the details concerning the clash. I can only judge from the respective statements of the two sides that each is blaming the other. The Chinese Foreign Ministry statement, however, of 2 days ago seemed an exceedingly tempered, if not legalistically argued, case.

I would not take either case *a priori* as obvious truth in this kind of border incident between the Russians and the Chinese.

Senator FULBRIGHT. The historical background of that particular struggle, as related in the paper this morning, is a rather typical case, arising from old conflicts. They have occurred in Europe where one country during its period of strength has taken the territory of another. It is not unlike, say, the Saar region where one country takes it for a while and another country gets stronger and takes it back. Isn't it sort of a typical case?

Dr. WHITING. It is a very conventional type of international dispute.

Senator FULBRIGHT. Yes, there is nothing special to indicate any kind of aggressiveness on the part of the Chinese.

Dr. WHITING. Not in the least.

THE WAY NATIONS BEHAVE

Senator FULBRIGHT. You said in your statement something which rather interested me. You said this is the way nations behave, Communist or not, Chinese or not. What is the way nations behave? Will you elaborate on that a little?

Dr. WHITING. I was suggesting here that cases where the Chinese Communists have used force outside their borders fall into conventional patterns of international relations, sending force over a border dispute, sending force on behalf of an alliance against a third country which is seen as a common enemy. In the Communist ideology we are the enemy of China in Vietnam and China in Korea. In the traditional power balance of the southern continent the enmity between Pakistan and India and between India and China throws China into a natural non-Communist kind of alliance with Pakistan. So in the Indian clash of 1965 we had the kind of conflict we have had recurring for hundreds of years or more in international behavior. Nations don't live by rules, but clubs, unfortunately.

Senator FULBRIGHT. I think implicit in all of this, in all three papers, is this question of how do nations behave in view of the nuclear threat. I think this poses a very important question. I happen to be of the school that believes the invention of the hydrogen bomb is not just another weapon; it is larger than the old carbine or even a howitzer and really changes the nature of the game, so to speak. But we have not yet succeeded in finding a proper response to the invention of the bomb.

When you say this is the way nations behave, it raises the question as to the way they have behaved in the past. I am not at all sure we can survive if we don't change our whole view about the nature of international relations and how we are going to behave in view of these threats.

SENATE VOTE

Mr. Chairman, may I say that there is going to be a vote within a very few minutes, and I happen to be interested in that vote. It is on Senator Dodd's reservation to the Nonproliferation Treaty, so I suggest we recess and go vote.

Senator GORE. The Chair has asked the staff to serve coffee to you gentlemen while we go over and vote, if you would be so kind as to excuse us. The committee will stand in recess.

(Brief recess.)

Senator GORE. The committee will come to order.

EFFECT OF DEPLOYMENT ON NEGOTIATIONS

Senator FULBRIGHT. There was one question I guess I would properly address to either Dr. Kaysen or Dr. Shulman. When the new Director of the Arms Control and Disarmament Agency, Mr. Smith, testified before the subcommittee, he said that the Soviet Union had already discounted the impact of any Sentinel deployment on negotiations. In other words, whether we deployed or not wouldn't matter to the prospects for negotiations.

Would you agree with that, Dr. Shulman?

Dr. SHULMAN. It is hard to tell, Senator, whether they accepted our deployment from the time that the Secretary of Defense made a speech in San Francisco. There is a law sometimes called the "law of anticipated reaction," in which the effect sometimes precedes the cause, and from the time this was first talked about they may have begun to think, at least in their military planning, about what effect this might have. But I don't see how we can know that they have discounted it. As a matter of fact, you could probably make as strong a case for the opposite view.

Senator FULBRIGHT. In this morning's New York Times, there is an account of an article in Izvestia which takes exactly the opposite view.

Dr. SHULMAN. Yes, sir.

Senator FULBRIGHT. Would you give any credence to that article?

Dr. SHULMAN. Yes. I haven't seen the full text, Senator, but on the basis of newspaper accounts I have these observations. First, the article in Izvestia is by a responsible commentator, Vikenty Matveyev. It is hard in any article appearing in the Soviet press to determine what part represents the serious analytical component and what part is intended for political effect. The timing of the article and the language of it, from the quotations I have seen, suggest that it is, at least in part, aimed at a reaction from this country. But I do take the argument it advances seriously and it does confirm what we have observed elsewhere. Its main function is in the political and psychological realm. One emphasis in the piece was that the decision the administration makes would be an important indicator of the direction the new administration is going to take and which pressures it will respond to. The article advances the dichotomy in American public life between what it calls the "functionary adventurers," by which it means the men in the Pentagon, and the sober realists, by which it means the men on this subcommittee.

Senator FULBRIGHT. I think it is a very appropriate comment.

Dr. SHULMAN. Against this simple dichotomy there is the more serious question, and a real one in the Soviet mind, as to what the new administration is going to be like and in what directions it is going to go.

There is a second point that is indicated in the quotes that I saw the relationship of this decision of deployment of ABM to missile

talks. The article emphasizes that the talks are not to be used as bargaining—they won't be effective as such—and, that it does not think it equitable to attach political conditions.

Finally, it seemed to affirm the continuing interest of the Soviet leadership in starting the talks. That is important.

As far as the discounting in a military sense, that is, what kind of changes in procurement and deployment the Soviet Union might make, the article, so far as I know, doesn't have much to say. As suggested in my statement, the military aspect of the subject has dropped completely out of the Soviet press, publicly available, in recent years.

(The article referred to follows:)

[From the New York Times, Mar. 13, 1969]

MOSCOW SUGGESTS SENTINEL COULD HAMPER ARMS TALK

Moscow, March 12.—The Soviet Government newspaper Izvestia suggested tonight that deployment of an American antimissile system might set back the chances for successful United States-Soviet talks on arms control.

Breaking its silence on the debate in Washington over deployment of the Sentinel missile defense, Izvestia said that the current balance of forces between the United States and Russia "offers a possibility to conclude agreements on the freezing and reduction of nuclear armaments."

"It is well known," its leading commentator, Vikenty Matveyev, said "that the Soviet Union suggests the beginning of talks on the restriction and reduction of both offensive and defensive nuclear weapons."

But Izvestia said, in an apparent reference to the Sentinel debate, "Steps that may be taken in the field of disarmament must not place any state or group of states in an unfavorable position in respect to other states."

The Izvestia article was given prominence here and seemed to be an effort by the Soviet Government to add its voice to those trying to persuade President Nixon to cancel or postpone plans for starting to deploy the Sentinel system.

The article seemed to hint that installation of antimissile missiles might cause the Russians to have second thoughts about holding arms talks. But senior Western diplomats pointed out that Moscow already had a small-scale system of its own and agreed to holding talks with the United States last year after President Johnson and Congress approved going ahead with the Sentinel deployment.

Izvestia said there was a split in the United States between those who were "soberminded" and those who were "adventurists." It praised former Defense Secretaries Robert S. McNamara and Clark M. Clifford for advocating, after they left office, a prompt start of talks with the Soviet Union on disarmament. Actually, both men were on record for such talks while in office.

LAIRD CONSIDERED TARGET

"Words, of course, are insufficient," Izvestia said. "Other words are being heard from high places in the United States. Their authors propose 'not to rush' into such talks and call for creating a 'position of strength.'"

Izvestia said that those voices wanted to step up the arms race and advocate the deployment of the Sentinel system in the absence of an agreement with the Russians.

Observers believe that much of the criticism was aimed at Secretary of Defense Melvin R. Laird, who has advocated a start to deployment, but he was not mentioned by name.

Much of the article was devoted to deploring the high costs of new arms.

"Every day emphasizes with new force the acuteness of the disarmament problem," it said, "because every day huge sums that are so needed for peaceful, civilian needs are spent on military production."

IMPORTANCE OF INTERACTIONS BETWEEN GOVERNMENTS

Dr. KAYSEN. Mr. Chairman, may I comment on it?

Senator FULBRIGHT. Yes, indeed.

Dr. KAYSEN. It seems to me that Gerard Smith's assertion misses a very important point, one which he can't possibly be confident on. I

am sure the Soviet military and the Soviet research and development establishment have ideas about mobile missiles, about aimable warheads, about this, that, or the other thing, and those fellows are just like the same kind of fellows in our Government, they are fighting for their share of the budget, they are looking for arguments, they are people who say, "Well, let's let that one go until next year. We can't spend the money this year."

When we start to deploy, having publicly announced that we will, well, the other fellows will say, "Let's get on with this mobile missile thing. Let's get on with the next generation, let's raise the target from X to Y," and they get an argument from that side.

This is how that process of interaction goes on.

It has a long leadtime and we shouldn't forget that and we shouldn't do anything to help it along.

Sometimes the Soviets do foolish things, but we can't count on it. As far as we can tell, it is just a guess. Most people who know something about it believe that what we call the Tallinn system, which for a while some people thought was an ABM system, is an air defense system built against the B–70. Well, we never built the B–70, but we talked enough about it to get them started.

Now, that may be a harmless waste of money, but we can talk up some things that may have some other effects, and I think those interactions which Mr. Smith's statement, that you quoted, seems to neglect entirely, those interactions are very important.

Senator FULBRIGHT. In view of what you say, it seems to me the only thing supporting his statement would be an assumption that the ABM is of no account at all. It is utterly worthless, the Russians know it and, therefore, they wouldn't take any notice of it. If they believe that, which it probably is, his statement could be true, couldn't it?

Dr. KAYSEN. I suppose that is so.

EFFECTIVENESS OF SOVIET GALOSH SYSTEM

Senator FULBRIGHT. If they know it is no good, they have tried it themselves. We have some information that the Galosh system is of very limited usefulness and they have slowed it down and are really not proceeding actively in spite of what the Secretary of Defense said yesterday. I don't know how the Secretary of Defense's information is so often at variance with the intelligence agencies of this Government but it is directly at variance on a point of this kind. According to intelligence information, the Galosh system has been slowed down.

Mr. Shulman, in view of your specializing in Russian matters, do you have any information on the Galosh system and how effective the Russians regard it and are they moving actively toward its deployment?

Dr. SHULMAN. My impression, based on unclassified sources, Senator, is that the Galosh system itself has not been actively developed, but that there may be continued experimentation, particularly with the radar components of it.

Senator FULBRIGHT. I am not talking about research and development, only deployment.

My information is, and it isn't all unclassified, is that the original projection has not been carried forward. They have slowed it down and it is very dubious whether they will finish it or not.

I don't want to take too much time. There is one other aspect I want to return to with Mr. Whiting.

CHINESE ATTITUDE TOWARD HUMAN LIFE

From the days maybe of the "Yellow Peril" period of the early century, there remains one feeling that somehow or other the Chinese are different, that they don't mind losing 50 million people. You hear that there is a different concept of life in the Far East, and the assumption seems to follow that they would do this irrational thing.

Would you comment upon this? You have spent many years in the Far East. Do you think the Chinese people care less for living, enjoy it less than you do or we do?

Dr. WHITING. Absolutely not.

Senator FULBRIGHT. Would you say a few words about it? This is a very common idea and it is implicit in these lectures I mentioned to you.

Dr. WHITING. I have been most impressed with the way in which the Chinese Communist leadership has avoided taking risks under situations which would have seemed to compel them to gamble away half their nation's population.

In 1950 when President Truman announced we were placing the Seventh Fleet between the Chinese Nationalists and the Chinese Communist forces in the Taiwan Straits, it was an act of perhaps unprecedented boldness and daring, intervening in a civil war. It is a very risky thing for any country to do, particularly when the side you are intervening against has been victorious up to that point. And yet obviously for the last 19 years the regime in Peking has been loath to risk many Chinese lives in pursuit of their objectives against the Chinese Nationalists in Quemoy and Matsu, right off the Chinese mainland, and Taiwan which is a hundred miles off the mainland. I think this assumption is not true that they care little about the consequences to Chinese lives.

Senator FULBRIGHT. Is it not a fact there is a recurrent theme in articles in this country and statements by some of our people who support what you called functionary adventurers?

Is that not so, am I incorrect in that?

Dr. WHITING. It is one of the arguments that is raised and sometimes it is argued on the basis of Chinese tactics in warfare, where in lieu of firepower they have expended manpower, but a tactical choice on the battlefield is rather different from a strategic choice made before war.

Senator FULBRIGHT. Yes. Isn't it odd that the Chinese are so careful about engaging their own men and we go 10,000 miles away with our men and expose them. Actually, over 32,000 Americans have been killed, and 200,000 wounded. Isn't this a rather odd contrast to what you are saying about the Chinese being so careful about not putting their men in, even in clashes right up against their own border?

Can you image what we would do if the Chinese were as close to us as we are to China in South Vietnam? Do you think we would be as restrained as the Chinese are?

Dr. WHITING. If we had as much disparity of power between themselves and ourselves, I think we probably would be restrained. The question is what risks you take for what gains, or what vital interest at each given point.

CHINESE ARTICLE ON OUR MEN IN ASIA

Senator FULBRIGHT. Lastly, I want to ask if you remember an article picked up by one of our newspapers about an editorial in one of the government papers in China, saying that they should be very obliged and grateful to the Government of the United States because we had brought our men over to Asia where they could be destroyed, and that they had no way of destroying them or injuring these imperialists otherwise? Are you familiar with such an article?

Dr. WHITING. I remember such a line, yes.

Senator FULBRIGHT. It was taken from the official Chinese paper.

Dr. WHITING. Well, the Chinese have various ways of, as Mao puts it, of turning bad things into good things. This was one of their more sophisticated rationalizations of the situation. It has not been used terribly frequently, however, on the mainland.

Senator FULBRIGHT. It was reprinted in The New York Times, I think.

Dr. WHITING. Oh, yes, the statement occurs as you have summarized it.

Senator FULBRIGHT. It did occur. It is at least food for thought.

Mr. Chairman, I apologize for taking so long, but these gentlemen are so provocative in their statements I couldn't help it. I do hope that the country pays attention to what they have said this morning.

Senator GORE. Senator Case?

Senator CASE. Thank you, Mr. Chairman.

COMPELLING CASE FOR AN ABM DEPLOYMENT NOT SEEN

I wonder, Dr. Shulman, if you could imagine for us what would be, as you put it in your statement, "a compelling case for the immediate deployment of an ABM." We are going to have to meet arguments, and I would like to hear what you had in mind there.

Dr. SHULMAN. My intention, Senator, was to suggest I do not believe there is a compelling case for the immediate deployment of an ABM.

Nothing I have heard in the discussion of this issue so far and nothing I have read, including the technical journals in the military field, seem to add up to a compelling case for an immediate deployment.

I can visualize some circumstances in the future that might make us want to look at the possibilities for some forms of protection against the possibility of greater relative invulnerability of our fixed-site missiles. But this is very much a problem for the future. It is a very uncertain one at the present time, and so my answer is that I see no compelling case at all.

Senator CASE. Then what rationale is there for doing this thing?

Dr. SHULMAN. There are two major grounds on which to argue. One is that by some time in the mid-seventies or later, if the Soviet Union acquires a more sophisticated weapons system that might call into question the relative invulnerability of our fixed-site missiles, we might need to be in a position to extend their invulnerability by increasing the hardening or by some form of missile defense.

There is another line of argument, one which may come up in your hearings next week, that says that in theory some form of missile

defense could be stabilizing, could make it possible to have an arms control agreement. The argument runs that there would be an added measure of confidence that would make each side willing to take risks in reducing offensive weapons.

I do not find that argument persuasive at the present time because it presupposes that there is in the first instance a reduction in offensive weapons. Since that isn't the case now, I think that all the adverse effects take place without any of the stabilizing effects that are claimed for it.

A SYSTEM TO DEFEND MISSILE SITES

Senator CASE. On your first point, Dr. Kaysen adverted to this, too, and suggested, as I understand it, that there are better ways of defending our missiles than anything now in prospect so far as an anti-ballistic-missile system goes. I am correct, am I not, in stating that?

Dr. KAYSEN. That is right, Senator Case. I am saying that we now are talking about deploying a system which was conceived basically as an area city defense system.

If we wanted a system which defended our missiles and that was its prime purpose, it is not clear to me, and this gets to be a very technical question in which I am trying to understand what other more qualified people say, but it is not clear to me that the kind of system we now have is the one we would design and build, if its real purpose from the start were protecting the missiles.

Then you would have to ask the question, suppose we agree that some place down the road the Soviet force was getting more threatening, let's say we had a try at arms control agreements and after a long time we felt we were making no progress, and we believed that they were building more missiles, that their aiming points, their error was going down, they were getting better in a variety of ways we think we know about and, therefore, the security of our fixed-site missiles was threatened, as Marshall Shulman suggested, then I think you have to say, what is the effective way to counter it? Maybe it is a hard-point defense system and, as I just said, if it were a hard-point defense system it would be likely to be somewhat different from the one we now contemplate.

It might be something else. We might say, "Well, let's build more boats and let's say we will have a different mix. We won't rely so much on fixed-land based missiles, fixed-site land-based missiles."

What troubles me is that we have had three different, well we have had two, and we seem to be about to get the third, different arguments for doing the same thing, and it is a little hard for me to believe, just as a very abstract proposition, that if you have a system which you start out with for one purpose, that it is the best system for quite another purpose and still the best system for a third and very different purpose.

So I find this a little troublesome.

Senator CASE. You wonder what the real purpose is, if any. [Laughter.]

Dr. KAYSEN. Well, I would suggest no more, I don't want to be disrespectful of the hard working and serious people in the military, but I would suggest no more than their behavior is consistent with the following question: Here are some fellows who have a system that they

are determined to deploy, and then the question is what is the reason for deploying it, and that, the answer to that question depends on the context of the argument.

MCNAMARA'S DECISION ON SENTINEL

Senator CASE. Have you ever been able to figure out why Mr. McNamara ended up his 1967 speech the way he did in recommending this thin system after presenting in almost as clear and logical a way as you gentlemen have the reasons against any anti-ballistic-missile system?

Dr. KAYSEN. Well, I am a great admirer of Mr. McNamara's.

Senator CASE. So am I.

Dr. KAYSEN. I think he is one of the most able people who has ever been in the American public service whom I know. I know him well, and have worked with him, and I confess that I am puzzled about it.

Certainly there is some suggestion that this may have been a decision that he felt he had to accept and not one he had to agree with. I think everybody in the Government finds himself in that position from time to time.

Senator CASE. I am not doing this either to embarrass you or to cast any question upon his motives, but rather to find out if we can what they were so we can consider them.

Dr. KAYSEN. Well, you know I can only speculate. You really would have to ask Mr. McNamara.

Senator CASE. Mr. McNamara would give the same reasons he gave before.

Dr. KAYSEN. I can say only that I thought the speech he made, minus the last couple of sentences, was the best argument against deploying the system anybody has made.

DIFFICULTIES OF ARMS REDUCTION NEGOTIATIONS

Senator CASE. Mr. Kaysen, you see increased difficulty, if this action is taken, in bringing about effective arms reduction negotiations. It has also been suggested that once both sides reach a higher level of armaments, both defensive and offensive, that because of the peculiar reluctance of the Soviet Union to permit inspection it would be much more difficult for us to be sure that an arms limitation agreement was going to be observed and that we would have greater difficulty in accepting it.

Is this a valid proposition, as you see it?

Dr. KAYSEN. I think there is a very important problem to which this points but it is less a problem of numbers as such, than it is a problem of different kinds of weapons.

Right now both the Soviets and ourselves rely very heavily on fixed land based missiles, the Soviets in relative terms much more heavily than we do. We know they are building submarines something like the SSBNs [nuclear powered Polaris-type submarine], but we don't believe they have so many of them yet as we do.

We are pretty sure for well-known reasons what they have and where it is. Of course, they have only to read Rockets and Missiles and the Secretary of Defense's statements and so on, to know a great deal about us. We are an open society.

When weapons change their form, problems become very difficult.

If you think of putting two, three, five, 10 warheads in one package, then we are no longer certain when we see a firing site and a missile, how much to count it. Do we count that two, do we count it five, do we count it 10? It is very hard.

LAND MOBILE SYSTEMS

Neither of us has land mobile strategic systems. We have little tactical systems, but neither of us has land mobile strategic systems.

One of the natural responses to the development of maneuverable aimable independent multiple warheads is, "Let's go mobile; let's get land mobile systems."

We talked about it in the past and we put it aside. We may start talking about this again. Once you get land mobile systems it is very hard to count them, count the other fellow's. It is very hard to know where they are. It is even hard to devise an effective inspection system.

If we were given a lot of inspection power in the Soviet Union, and we were told, you know, "You can do this, you can do that, you can have fellows who run up and down the roads"—I think we could find out a good deal, but it would certainly be a great deal more difficult than it is now.

One of the things about these systems is it is very hard to take them one at a time. We got interested in MIRV because we thought the Soviets were deploying a big ABM system. If we start deploying a big ABM system, the Soviets are going to work in that direction.

When we both work in that direction, then we will say, "Well, mobile missiles are the next step," so we are not—and this, to me, is a very central point, so I hope you will forgive me for repeating it—so we are not just asking, "Are we deploying some limited ABM defense?" Rather we are asking, "Are we taking a step that looks like the step down the path into a quite different set of deployments and a quite frightening set, from the point of view of our security, from the point of view of arms control, from the point of view of stability?"

Senator CASE. Thank you very much.

Just one question, if you would, and I shall finish.

WEAPONS AND POLICY

In your last paragraph you have the arresting statement: "Do weapons dictate policy, or do we decide on the basis of our policy concepts what weapons we wish to deploy?"

That, of course, does not mean that we ignore our capability in terms of weaponry, does it?

Dr. KAYSEN. No, not at all.

Senator CASE. Will you just develop this a little bit, because this may be thrown back at us again.

Dr. KAYSEN. What I meant by that statement is that there is a natural impulse, and I think a perfectly understandable impulse and, in fact, a desirable impulse, on the part of people who are responsible for developing new systems to deploy them, and with respect to a new system it is always possible to make an argument that it adds to our defense capability or it adds to our offense capability or does something that an existing system does not do.

In these terms, in the narrowest sense, you know, it produces a new kind of noise or it produces a noise in a new place, and so on—these systems do that.

I think the people who are developing systems are highly competent and highly dedicated people. They set themselves some technical problems to solve, and they try to solve them.

But the question that has to be asked is: "OK, we now can do this new thing which we could not do before. What does it do for us that we need done?"

Let me give you an example: You may remember, as I remember very vividly, in 1962, when the Soviets had been testing—you remember they resumed testing in the atmosphere and they tested some quite big weapons, bigger weapons than anybody had tested before, and we were told various things about what these tests indicated for the possibilities of still bigger weapons.

Now, the response of the laboratories and the response of the parts of the Department of Defense which are responsible for nuclear warheads was to say:

"We ought to test a big weapon; we ought to design big weapons. Our biggest weapons are only so big, and now they have a capability that is so many times that."

Well, those of us who had some responsibility in this connection—I had a small part in it—pressed with the question, "OK, agreed. The Soviets have this and we do not, and if we want to have it we had better set to work. What will we be able to do with it that is useful to do that we cannot now do some other way?"

But we never got a positive answer to that question: "What can you do with one big bang that you cannot do just about as well with four little bangs?" And similar questions.

POLITICAL PURPOSE SHOULD BE KEPT IN MIND

Well, it is those questions answered not in terms of technical capability but in terms of political purpose that I think we have to ask, and I think that we should not expect that the professional scientists who work for the services and who are dedicated men doing their job, that the service chiefs, themselves, should be the people who ask the question: What is the political purpose, what is this for?

I think that is the responsibility of the civilian-elected officials of Government and especially the responsibility of the President on the one hand and the Congress on the other.

Senator CASE. Thank you very much.

Senator GORE. Senator Church?

Senator CHURCH. Thank you, Mr. Chairman.

BASIS FOR CHINESE HOSTILITY TOWARD UNITED STATES

Mr. Whiting, I would like to go back for a moment to the consideration of China and pursue the point that was developed by Senator Fulbright relative to the "yellow peril" concept of China in the modern world.

We are frequently told by those who defend the present American policy toward China that it is necessary because the Chinese are

utterly irrational in their attitude toward us, and the bristling anti-American statements of prominent Chinese leaders fill our newspapers, providing us with continuing proof of, if not the wisdom of our policy at least the futility of changing it.

I would like to start by asking you if you think there may be some plausible basis for the hostile Chinese attitude toward the United States.

Dr. WHITING. I think the basis for the Chinese attitude toward the United States has to be broken down into several components.

I think the historic experience of Chinese governments, and indeed a good portion of the Chinese people, over the past century has been one of exploitation by foreign powers, intervention of foreign powers, betrayal by allies in World War I and World War II. This, together with the very frustrating sense of an inferior power relationship, has built up what we call xenophobia, a suspicion and, indeed, in many cases, a hatred for foreign powers, as such.

This is one emotional framework within which experiences are interpreted, evidence of malevolence may be exaggerated.

A second component undoubtedly is the Communist assumption of conflict between imperialism and communism. As the Communists define us as an imperialistic power, we are, therefore, part of an enemy camp.

The third element, and this, I think, is one of the more operational elements in day-to-day decisionmaking is what has happened in their interaction with the United States.

CHINESE CIVIL WAR

Certainly, for the Chinese Communist leadership, the assumptions of enmity and hostility which they, themselves, articulated in the late 1940s, received a very significant amount of reinforcement when we did intervene in the civil war in 1950 and when we went further in our initial objectives in the Korean war, expanding on those objectives, rolled our armies up to the Yalu River against the explicit warning from Peking that this could bring about a conflict.

This civil war proposition cuts to the marrow of what the Chinese regard as their internal affairs. To ignore it or to shunt it aside as something that should be talked about in Warsaw seems advantageous from our standpoint, but from their standpoint it is a simple question of civil war.

I think in the last 5 years, the personal element of Mao Tse-tung is an additional factor exacerbating their perceptions or at least their statements with respect to the United States.

It would be foolish for us to assume that all of his colleagues think contrary to Mao. They, after all, had these experiences that I have already identified, but it certainly also would be self-defeating to project perpetually the vision that Mao has of the conflict with the United States or the conflict with the Soviet Union or India or with any other Chinese protagonist.

Policies, in the last instance, are made by men, and in the Chinese decisionmaking system I am sure there are tugs and pulls depending upon perceptions, depending upon vested interests, and depending upon experiences.

We, therefore, can interact so as to reinforce this hostility or this enmity or we can react so as to challenge its credibility. Over time this relationship must be diffused, because the risks of continuing it indefinitely through the balance of this century, I think, are very serious.

QUESTION OF TAIWAN

Senator CHURCH. In that connection, Dr. Whiting, let me ask if there is any difference of opinion between Chiang Kai-shek and Mao Tse-tung on the question of Taiwan being part of China?

Dr. WHITING. None that I know of. I think they both agree that this is China.

REVERSING POSITION OF CHINA AND UNITED STATES

Senator CHURCH. Then, in examining and assessing this Chinese xenophobia toward us, perhaps it would be useful to recall an Indian saying in the American West—an old saying out there—that if you want to know another man you must walk a time in his moccasins. That is very difficult to do for some reason, particularly for nations to do.

Suppose that our relative positions were reversed, that the Chinese had the predominant military power, that we were relatively weak compared with China, and that China were asserting her power by deploying Chinese forces in a ring around the United States comparable to the ring that we have deployed around China. That is, let us suppose that the Chinese had a 7th Fleet between the mainland of the United States and Hawaii, where they were supporting a pretender government in Honolulu, and suppose that a civil war were going on in Mexico in which the Chinese had chosen to intervene and that there were half a million Chinese troops in south Mexico attempting to impose a Chinese solution in that war, and suppose there were 50,000 more Chinese troops in Cuba, completing an arc rather comparable to the one we have established around China which runs from Japan through Taiwan and South Vietnam to Thailand, encircling much of China.

If it is possible for us, as Americans, to imagine the opposite arrangement, would it not be plausible to suppose, or even to anticipate, that there would be a certain amount of distaste for the Chinese manifested in this country?

In fact, would it not be a fair guess that no administration would last long in Washington that did not dedicate itself implacably to driving the Chinese from the Western Hemisphere?

Dr. WHITING. I think your question answers itself. Yes.

Senator CHURCH. I think it does, too; that is why I asked it that way. [Laughter.]

REASON FOR DEPLOYMENT NOT SEEN

Senator CHURCH. I am interested also in the question that Senator Case asked concerning the reasons for deploying an ABM system at this time.

I have listened to the excellent papers you gentlemen presented this morning. They are as persuasive and as well reasoned, I must say, as any I have read or heard on this subject.

I think it was Dr. Kaysen who said in his paper that if we do not need an ABM as a part of a deterrent against Russia, with its massive nuclear power, why on earth do we need it against China?

I also share a high opinion of Mr. McNamara, but I think the most uncharacteristic position he ever assumed, the most contrived and unconvincing, was that in which he undertook to defend the decision of President Johnson to deploy a thin ABM.

I have pondered the reason this was done, and I must say that I agree with Mr. Reston who described the ABM as the Johnson administration's biggest mistake, I think, yesterday.

I would say this. If the ABM was unneeded against China and useless against Russia, then, the only reason appears to me, for having made such a decision is to erect some defense against the Republicans in the last election, and the Republicans have won that election.

Now, why continue the charade?

I certainly hope that the President will give careful attention to the expert testimony before this subcommittee, that he will weigh it heavily in the balance before he reaches a fateful decision which could commit this country to a vast expenditure for little or no purpose at all, and which, as you gentlemen have pointed out, could, indeed, make us less secure rather than more secure.

ABM DECISION NOT NECESSARILY FINAL

Senator CASE. Would the Senator yield at that point?

Of course, I share his view and his hope. But I just want to suggest this, that even if a pending decision is announced that we think is not the wisest and soundest one, we should not accept this as final, and I mean this not in any disrespectful way at all or in an effort to carry on lost causes, or anything of that sort.

I think this decision is not going to be made final until these things are in the ground, and we should not accept that until a decision is so made.

After all, the Senate has had a time and is having now a time, for penitence, and so should any administration. The Johnson administration—of course, this is no longer possible, but it is not impossible for the present administration.

Senator CHURCH. Mr. Chairman, I certainly share the position that Senator Case has taken completely. I think that we do have a duty in the Senate to fight this all the way through, and I would hope that we would be reinforced in that position by the decision of the President.

But whether or not that proves to be the case, we have our own constitutional responsibility, and I hope we will carry it all the way to a final vote on the Senate floor.

Senator GORE. I just want to recall to you distinguished phrasemakers some capacity on the part of Senators. This phrase that Senator Church just used in describing the ABM as "useless against Russia and unneeded against China" is a pretty good one.

Senator Cooper?

EFFECT OF PROLONGED NEGOTIATIONS ON OUR DEFENSE

Senator COOPER. One of the arguments of those of us who oppose deployment make is that we should start negotiations and find out if it is possible whether we could agree with the Soviet Union not to deploy

an ABM system any further and to stop further nuclear arms buildups. I think Dr. Shulman is correct when he says that we should carefully avoid creating expectations for early and dramatic results in such negotiations.

While I have talked about the necessity for negotiations, I do not assume they would be easy nor would they be likely to lead to any quick decision. This brings me to an argument which has been made for deployment. I think that Mr. Laird and others have suggested that negotiations, being so uncertain in their conclusions could possibly be continued so long that we endanger our own situation by not proceeding, as they say, in a very careful and limited deployment of a defense system.

What weight do you give to that latter argument?

Dr. SHULMAN. Well, Senator Cooper, I would like to respond initially, to the first part of your question how one should judge the productiveness of negotiations.

BYPRODUCTS OF NEGOTIATIONS

It is often the case that the byproduct of the negotiating process may be terribly important and may, especially in this case, be more important than a formal outcome.

The very process of preparing for negotiation obliges a government to make some decisions, to look at where it stands, to question why and what they are for, what is important to us. It is not until you face a deadline for the negotiating process that you mobilize the whole Government to ask questions and bring people together to think about these things. And that, it seems to me, is important.

For example the fact that last summer, before Czechoslovakia came along, when we were getting ready to go into negotiations, a governmental process was activated to look at what our security interests were. This was useful in itself. I think the same thing clearly happens on the Soviet side, the anticipation of a deadline and the need to state a position does make things happen within governments.

Second, my impression is that over the years of the nuclear age, the processes and negotiations and contacts of various kinds—including the visit that Senators Gore and Pell paid to Moscow and their conversations with Premier Kosygin—have a residual educational effect that you cannot always measure but which may be terribly important.

There is a kind of diffusion of conceptions that goes on, there is an educational process, with much to be learned by both sides, because we are just becoming aware of the effects of these complicated technologies and beginning to have insights into what makes for stability, what makes for instability.

I have no doubt that the side effects, the educational effects, will be useful even if a treaty does not emerge in the near future.

Third, my impression is that the most important kinds of arms control we have had over the last decade or so come not so much from explicit agreement as from the tacit restraints that develop. We are beginning to be able to think at least one or two steps ahead in the process of interactions and, in part, this comes from having had contacts, exchanged ideas.

That what is happening around this set of problems—including the discussion on the ABM issue—has the effect of widening the constitu-

ency of the people who are concerning themselves with these problems. It is good, to ask the kind of ultimate questions that Dr. Kaysen referred to.

So, if we are looking for some test of the productiveness of these negotiations, I would not limit it just to some formal piece of paper containing solemn agreements but I would watch what each government is doing over a period of time. My belief is that the effect would be salutary.

Senator COOPER. I thank you. I think that answer explains your statement in the same paragraph that they may at least use tacit and reciprocal restraints rather than specific treaty agreements.

EDUCATIVE PROCESS THROUGH A NATIONAL COMMISSION

Now, another argument is made, and it is an effective argument, I think—because it is an emotional argument—because it deals with the question of security and saving lives.

The statement was made in our Senate debates and it has been made by officials in the Government that we must make no mistake on the issue of security. Of course, it has not been stated what true security is, but the argument does have an emotional impact. I have found it from letters and from other conversations with my own constituents and other people. If we can in fact build a missile to shoot down a missile coming in, why shouldn't we use it to protect our country?

Why shouldn't we take that step, they ask?

This question is so technical and it is difficult to explain the details and purposes of the systems—all of us have had to try to educate ourselves on these issues—but the Pentagon, of course, has been dealing with this for a long time.

Against the weight of their statements and their arguments we have tried to inform and educate ourselves and the country, but the only balance we have against the arguments of the Pentagon is from people like yourselves and from the scientists—some of whom have spoken before this committee.

My point is this: In order to give more confidence to the American people in any decision that might be made, would you not say that Dr. Killian's suggestion for a national commission is a very good one, that there should be brought into this areas of discussion, information and study—an independent group of scientists and others such as he suggested?

If such a commission were appointed, and the decision were made later, after thorough study by our country's best minds and experienced men, either not to deploy it or to deploy, say, a missile site defense, would you not say that it would have greater acceptance in the Congress and among the American public?

Dr. SHULMAN. Yes, Senator, I would endorse the suggestion. I think it would be useful to continue the educative process, and I think also it would give us time to think soberly about this.

Mr. Kaysen has a comment he wants to make.

Dr. KAYSEN. May I comment on this point, Mr. Chairman?

Senator COOPER. Yes.

Dr. KAYSEN. I, too, think that Dr. Killian's suggestion was a very good one.

GAITHER COMMISSION

I would like to remind you, gentlemen, what I am sure you are aware of, of the very great importance of the Gaither committee, a commission of this type, on American security decisions a long time ago.

Senator Symington is nodding his head because he was sitting on the other side of Pennsylvania Avenue in those days.

Now, the Gaither commission, I think, did a very important job and set our security policy, in its essentials, for quite a long time. I think it is fair to say that we have not had the same kind of broad, high-level view by an external group since the Gaither commission. I do not want to downgrade the importance of what the Pentagon does or the tremendous work that the President's Scientific Advisory Committee and its panels do, the kind of work I used to do when I was at the White House, and my successors I am sure are doing, but I think it is very different when you are part of the Government, when you have some functional responsibility, and you are inside the machine.

PUBLIC REPORT ADVOCATED

But I would say that the Gaither commission had one serious disadvantage; it made only a classified report.

Now, inevitably, some parts of these things are classified. I think, however, we have come to learn in the course of the last decade that much less needs to be classified than we used to think and that you can read a great deal in the New York Times without having access to documents in green, blue, and pink covers, and learn a great deal that way.

But I would add the note that if the excellent idea of the commission is followed, it would be highly desirable for the commission to be so organized and constituted that it made what was primarily a public report that could be discussed and commented on in public.

Undoubtedly, the President might wish to have some annexes and discussions of particular rather narrowly technical problems that were classified, but I think the importance of having an objective, competent, broad view of our security policy, overall view, that can be put before the public and discussed in public cannot be exaggerated.

DECLARED SOVIET RIGHT TO INTERVENE IN A SOCIALIST COUNTRY

Senator COOPER. Dr. Shulman, how would you evaluate—and I am not talking about the invasion of Czechoslovakia now, because I think the reasons have been pretty well known—but how would you evaluate the declaration of the Soviet Union that it has the power and the right to intervene in any socialist country without defining which socialist country, and to protect such countries, in order to protect the social system they consider correct? Of course, there has been great concern in Rumania and in Yugoslavia. The Soviets have also made a declaration that they have the right to intervene in Germany under two articles of the U.N. Charter. What do you consider these new declarations represent as far as taking risks or a more aggressive attitude on the part of the Soviets?

Dr. SHULMAN. I would make a distinction, Senator, between the threshold of risk taking as it would affect the Soviet position in Eastern Europe and the Soviet position elsewhere.

It is clear that the Soviet Union regards Eastern Europe as a vital area and that its threshold there is quite low. Its response there indicates that in any situation in which they felt that the alternative was to lose effective control, they would take whatever measures were required.

I do not think this is true, however, outside Eastern Europe, as evidenced, for example on the line the Soviet Union took in regard to Germany, and the argument about the charter provisions, which it has not followed up.

The Soviet Union has been following two lines that are somewhat alternative to each other in regard to the Federal Republic. On the one hand, it has put some pressure on it in fairly tough language about "militarism" and "revanchism," and so forth. The main purpose of it is to isolate the Federal Republic and, perhaps, to give some support to the Eastern zone of Germany; but, at the same time, the Soviet Union has taken an alternative line intended to encourage the process of neutralism in West Germany.

There has not been any indication of an intention to use force in the solution of the German problem. Action is restricted to psychological pressure. There is the fact of the new disposition of Soviet forces in Central Europe; the presence of five or six divisions in Czechoslavakia which creates some psychological sense of pressure, but the Soviet Union has not indicated that it intends an invasion.

On the first point, Senator, the doctrine of limited sovereignty advanced by the Soviet Union has obviously had bad effects. It makes it very difficult to encourage other countries to consider associating themselves with the Soviet bloc, because it looks like a one-way road.

EFFECT OF CZECHOSLOVAKIA ON SOVIET MOBILIZING OF SUPPORT

At this moment, in Moscow, there is a preparatory meeting for a conference to be held later this spring or summer by the Communist parties. One of the effects of this doctrine and of the Soviet action in Czechoslovakia has been to make it very difficult for the Soviet Union to mobilize support from other Communist parties in an international conference to isolate the Chinese and to restore some measure of unity to the Communist movement. I think this is quite a serious operating problem for the Soviet Union.

Senator COOPER. I gather then that you do not consider the fact that the invasion of Czechoslovakia or these——

Senator SYMINGTON. There is a vote. I would ask permission, if I so decide, to file some questions, especially with respect to Dr. Kaysen's testimony, and would hope the President reads that testimony before he makes the decision.

Senator GORE. What would be the pleasure——

Senator COOPER. Do you want to ask a question?

Senator SYMINGTON. Thanks, but we do not have time.

Senator GORE. You gentlemen have impressed the members so very much. Would it be too much of an imposition to ask you gentlemen to return at 2 o'clock?

Senator COOPER. I just have one more question myself.

Senator GORE. They are voting now.

What about you, Dr. Shulman?

Dr. SHULMAN. I have a bit of a problem, Senator. Of course, this comes first, and if you think this is important I will do it.

Senator GORE. Can we come right back?

Senator SYMINGTON. Thank you, but it is not necessary for me. I will probably file some questions for the record.

Senator GORE. Would you mind responding to Senator Symington's possible questions in writing for the record?

(The question and answer referred to follow:)

QUESTION SUBMITTED BY SENATOR SYMINGTON TO DR. CARL KAYSEN

Would you develop in more detail why the limited deployment of the Sentinel ABM system around one or more Minuteman sites does not contribute to the security of the country; in fact, and in accordance with your testimony, could well contribute to the insecurity?

ABM AND THE DEFENSE OF THE STRATEGIC STRIKING FORCES: SAFEGUARD

REPLY BY DR. CARL KAYSEN, MARCH 31, 1969

The Administration has recommended the deployment of an anti-ballistic missile system to defend our own missile forces and strategic bomber bases against Soviet missile attack. In this mode, it has changed the name of the system, formerly *Sentinel*, to *Safeguard*, thus emphasizing that it has a new purpose and rationale—the third since the first announcement by the previous administration of its decision to proceed with deployment of an ABM system. The proposed deployment is at a modest pace: two *Minuteman* bases containing 300 of our more than 1,000 land-based launchers are to be protected by the end of 1973. Further, the program is to be subject to an annual review by an extra-Governmental advisory committee in the interim, to assess it in the light of the then current strategic and technical situation. The Administration has described this decision as necessary to maintain our security in the next five to seven years.

This chapter examines the necessity for making the deployment decision *now*, as opposed to the alternative of simply deferring decision for at least another year.

Before proceeding to this central question, a few sentences on the general rationale of deploying ABM's to defend offensive weapons are in order. Such a deployment is, in general, consistent with the principle of deterrence which has been the basis of our strategic policy for at least the past decade. Deterrence has rested on the capability of our offensive forces, including their appurtenances of communication control and the like, to survive an effectively launched surprise strike aimed at them and respond in sufficient strength to rule out a rational decision to attack by any possible opponent, what has come to be called our second-strike capability. This, in turn, has imposed a variety of requirements in our force in terms of numbers, location concealment, hardness, redundancy of communications, and the like. All of these, of course, have to be measured in terms of the capabilities, existent and potential, of our adversaries; in concrete terms, those of the long-range striking forces of the Soviet Union.

Active defense, if technically effective, could certainly play a part in adding to the ability of our striking force to survive an attack. Further, like hardening, dispersion and concealment, and unlike additions to the numbers of offensive weapons, it can do so without directly threatening the security of the second-strike capability of the other side. Thus, in itself, an ABM system designed to defend missile sites and bomber bases does not directly call for a response from an adversary whose own strategic doctrine is also based on deterrence. In so far as it conforms to this purpose, the proposed initial Safeguard deployment is preferable to the deployment of the Sentinel system previously proposed.

However, this general proposition does not meet the central issue, whether the present decision is *necessary* for our security, not just less undesirable than programs previously recommended. This, in turn, can be divided into two rather different questions. The first, primarily a question of technology and economics, is how effectively will the proposed systems function, both in its own terms, and compared with alternative modes of adding further to the survivability of

our striking forces. The second is a more complex and wider-ranging question, and also a more fundamental one; namely, is the increase in the prospective Soviet threat such as to require new measures to ensure the continued security of our deterrent force.

The first question has already been discussed at length in several other chapters of this volume. This discussion need not be repeated here; however, two points are worth noting. First, the present system was conceived and designed for quite a different task than the defense of missile sites and airfields, and a much more difficult and complex one. It is unlikely that, set the present task, our weapons designers would provide the present system as a solution. It is, therefore, quite likely that both a more effective and a cheaper system for performing the task could be created. This would be the case even if the system designers were limited to using already available elements in the way of radars and defensive missiles, provided they had some time to re-examine the problem, rather than adapting to the new task the array conceived for the defense of cities. Second, if the purpose of the system is increasing the survivability of our offensive forces, it should be evaluated in cost-effectiveness terms against such other alternatives as further hardening of existing missile-sites, increasing the proportion of the B–52 force on air alert, and other possible measures. There is no evidence that a careful evaluation of those alternatives has been made.

The second and more fundamental question is whether there is a newly increased threat in evidence or in prospect, which makes clear the need, now, to increase the capability of our strategic striking forces to withstand a surprise attack.

The Secretary of Defense, in his presentation to the Armed Services Committee of the Senate, has argued precisely that there is such evidence. He finds it in his projections of the rate of build-up of Soviet offensive weapons, especially of what we call SS–9 missiles, capable of carrying large warheads or multiple warheads. The facts on which this argument rests, so far as can be determined, are essentially the same facts from which the two preceding Secretaries of Defense drew quite different conclusions. (See the *Statements* of Secretary Clifford on the 1970 Defense Budget and the Defense Program for Fiscal Years 1970–74, prepared on January 15, 1969; and that of Secretary McNamara for the 1969 Defense Budget, presented for the House Appropriations Committee on February 14, 1968.) These show a rapid growth of Soviet land-based intercontinental missile forces from some 250 launchers in total in mid-1966; 570 in mid-1967; to some 900 by the end of 1968. Of these some 200 to 250 are of the SS–9 type, all of which were added since 1966. In addition the Soviet Union is building a missile-launching submarine force similar to our own, which now has some 50 to 100 missiles. Secretary Clifford, in describing the situation of the Soviets land-based missile force said less than four months ago, "The rate of increase over the past year has been somewhat greater than estimated a year ago. However, we believe the rate of increase will be considerably smaller over the next two or three years. Beyond that point, our estimates become less firm." The belief referred to is, of course, based on intelligence, not speculation, and involves the rate at which construction of new launching sites is going forward. Thus the Soviets in a year or two can be expected to have 1,200 or 1,300 land-based ICBM's compared to our present 1,054; at that point they will still have less than half our present number, 656, of submarine-launched ballistic missiles. In both categories they may or may not be continuing to expand their force further; we simply do not and cannot know now.

To use these estimates of current and immediate future Soviet strength—which it neither revised nor disputed—to justify a threat in 1973 or 1974, Administration spokesmen have simply projected continued growth in numbers of Soviet missiles, especially of the SS–9, at a high rate. Further, they have probably assumed, without explicitly so stating, that a substantial fraction of these would carry multiple, independently-aimable warheads, and also assumed, without any indication of supporting evidence, that these would be significantly more accurate than we now believe Soviet missiles to be. On the basis of these projections and assumptions, the Soviets are credited with a capability of achieving a successful first-strike against our land-based missiles, and even the intention of seeking to do so.

This is a curious, and—unfortunately—not a novel type of argument. Even in its own terms, it contains a glaring omission. The administration case included no attempt to explain how a first strike which attacked only our land-based missiles

could make sense, in the face of our mobile and concealed sea-borne force which could launch at least 400 one-megaton warheads—if not, by that time, 5 or 6 times that number of smaller weight. There was, to be sure, a passing reference by Secretary Laird to the possibility that developments in anti-submarine warfare might reduce the invulnerability of the Polaris force, supported by neither evidence nor argument, and inconsistent with known expert judgment in this field. Nor, in the alternative, are the Soviets deploying the kind of large ABM system for the defense of cities that would also be required by a serious effort to achieve a first-strike capability. But without a lively possibility of the first and evidence of the second, the notion that the Soviets are specifically seeking a first-strike capability is absurd.

More fundamental, however, is the weakness and danger of "worst-case" arguments, which proceed by projecting the assumed maximum capabilities of the other side as the measure of the threat. Such were the arguments that produced the "bomber defense gap" of the early fifties, and the "missile gap" of 1960. The large and rapid increase in missile deployments made in response to the "missile gap" was in turn an important factor in stimulating the build-up of Soviet offensive forces. And now we appear about to rediscover another "missile gap!" To be sure, we cannot say with assurance that a build-up of Soviet offensive forces at the rate projected cannot or will not take place. But what we can say with assurance is that we can safely wait to find out whether it is occurring, before deploying a defensive system to protect our missiles against its possibility.

Our safety in waiting rests on two factors. First is our fleet of SSBN's. Second is our general ability to react in a variety of ways in the next several years, should the Soviet build-up persist, and give quantitative and qualitative evidence that a response to it is indeed required. These include increased hardening of our existing missiles, increased use of airborne alerts for our bomber force, beginning deployments of defensive missiles, on a larger scale and at a faster pace, and if necessary increasing our offensive force. None of these is offered as a presently desirable course of action, but only as responses that could be made in a timely way to an increased Soviet threat and so avoid a dangerous situation for us.

In assessing the dangers of a continued rapid Soviet build-up, it is well to remember that for some years, U.S. missile and bomber forces outnumbered corresponding Soviet forces by factors of three to five, but this numerical superiority was not translatable into usable political power while it lasted, and is proving to be transient. Why should Soviet experience over the next several years prove to be different, in either aspect, especially when the total forces involved on both sides are larger, and the Soviets' potential "advantage," if any, very much smaller?

Thus we can afford to defer decision, rather than now moving ahead with the initial steps toward deployment of an ABM system to defend our missile sites. In view of the costs of any large new military system, and the difficulty of reversing direction once deployment has started, this in itself is a powerful reason for waiting. If a large new military expenditure is not strictly necessary, it is unnecessary.

But the case for deferring decision goes further. It rests on our strong interest in seeking strategic arms limitation agreements with the Soviets in the present, relatively simple and stable milieu of mutual deterrence. We are now in a situation in which we understand each other's deployments in both a quantitative and a qualitative sense. Deterrence is at bottom a political and psychological concept. It rests on the perception and interpretation of the military situation by political decision makers; and it is as much open to influence by changes in their operating environment or the attitudes they bring to their perceptions as by changes in the hard technical facts. This inevitably marks it with a certain elusiveness. It is clear that constant or slowly changing force structures, whose technical performance characteristics are reasonably well understood—subject, of course, to the important fundamental limitation that no one has experienced their use in war—provide a much more stable basis for mutual reliance on and acceptance of deterrence than a rapidly moving process of qualitative and quantitative competition.

Further, the current technical developments in weaponry could introduce significantly new elements of uncertainty into the situation that in themselves diminish the stability of deterrence. The natural response to our ABM deployments will be to hasten Soviet MIRV development and possibly deployment. This was our response to the initiation of a quite small Soviet deployment of a defensive system around Moscow; one which we now believe to be of limited effec-

tiveness. Whatever we say about the purposes of our own ABM and the limited scale on which we propose to deploy it, we cannot simply assume there will be no Soviet response. In turn this will stimulate our own efforts in this direction, and both sides will then look to the next logical steps of deploying land-mobile missiles. The result may well be a situation of great strategic instability and uncertainty, in which neither the numbers nor the characteristics of the weapons of each side are well known to the others; rather than the relatively secure position we are in now. In such a situation, arms control negotiations will become much more difficult. There will then be much greater technical difficulties in assuring some measure of parity and providing for even agreed, much less unilateral, inspection. Further, the very uncertainty of the balance will make the atmosphere unfavorable for negotiations.

The decision to begin our ABM deployment is, thus, not simply a small step needed to maintain the current balance. It is rather the first step toward a much more frightening strategic environment, which we should defer as long as possible, while we actively seek ways to make it unnecessary.

Senator GORE. Gentlemen, it seems that you are about to be excused. But I will be glad to invite you to lunch.

Senator CASE. Gentlemen, you have an engagement for lunch. We will see those of you who can come in the Senate restaurant right after our vote.

Senator GORE. We will recess the hearing.

(Whereupon, at 12:30 p.m., a recess was taken to reconvene March 21, in room 318 of the old Senate Office Building.)

STRATEGIC AND FOREIGN POLICY IMPLICATIONS OF ABM SYSTEMS

FRIDAY, MARCH 21, 1969

UNITED STATES SENATE,
SUBCOMMITTEE ON INTERNATIONAL ORGANIZATION
AND DISARMAMENT AFFAIRS OF THE
COMMITTEE ON FOREIGN RELATIONS,
Washington, D.C.

The subcommittee met, pursuant to recess, at 10:05 a.m., in room 318, Old Senate Office Building, Senator Albert Gore (chairman of the subcommittee) presiding.

Present: Senators Gore, Fulbright (chairman of the full committee), Church, Symington, Pell, Case, Aiken, Javits, and Williams.

Also present: Senators Percy and Eagleton.

Senator GORE. The subcommittee will come to order.

Let us please have decorum in this chamber. The committee welcomes the many guests, but requests their cooperation.

Mr. Secretary, Mr. Deputy Secretary, General Wheeler, Dr. Foster, the committee welcomes you.

The Chairman will make a preliminary statement which he hopes will not be too long.

SHARING RESPONSIBILITY FOR SECURITY OF COUNTRY

The Constitution places upon Congress the responsibility for providing for our common defense. The President is, of course, the country's chief magistrate and Commander in Chief of its armed services. Thus the responsibility for the security of the country is shared, and it is the greatest of all responsibilities.

The destructiveness of nuclear war today makes the avoidance of war between nuclear powers the only measure of their mutual security, as you so ably said yesterday, Mr. Secretary.

Never before have two great nations had such a mutuality of interest as now exists between the United States and Russia. It is the mutuality of self-preservation—the first law of nature and man.

This places a very high value on deterrents—deterrents to the initiation of nuclear war. This equation of deterrence has particular application today between the United States and the Soviet Union. Secretary Packard said yesterday that the Chinese threat is not much further along today than it was 3 years ago. So what we are really talking about, Mr. Secretary, and American citizens, is the equation between the United States and Russia.

Your principal argument yesterday, Mr. Secretary, was that the deployment of the ABMs around two Minuteman missile sites, one in Montana and one in North Dakota, would preserve the integrity of our deterrents.

Now, when this matter is considered in its broad context, it is, in my opinion, that the program you recommend would further endanger our security. It would make an armaments limitation agreement more difficult, if not impossible, to attain, and thus ultimately could degrade our deterrents and, thus, Mr. Secretary, on this, your principal point, I wish to join issue.

COMPONENTS OF OUR DETERRENTS

What are the components of our deterrents? I will list them in the order of their importance, as I understand it.

And you and I have worked together for a long while in this field.

First, our nuclear missile submarines. We have 41 such submarines. They run quiet and deep in the ocean. They move steadily in the deep and can fire with deadly accuracy from relatively invulnerable positions. Each of these 41 submarines carries 16 Polaris nuclear missiles—among our newest and most accurate. So we now have 656 Polaris missiles, any one of which can be fired upon one of the approximately 200 towns and cities in the Soviet Union. Soon the Polaris missile will be replaced with the Poseidon. Each Poseidon missile can have 10 nuclear warheads. Then, from the depths of the ocean, 6,500 nuclear missiles could be rained upon the Soviet Union.

We have about 1,000 Minutemen of which about 350 are in silos near the two missile defense sites in Montana and North Dakota, about which you propose to deploy the antiballistic missile system. And soon, it should be added, these 1,000 Minutemen will have 3,000 warheads if the MIRV program continues.

PERCENTAGE OF RETALIATORY CAPACITY PROTECTED BY PHASE I

Then, we have 7,000 tactical nuclear weapons in Europe and still a number of other nuclear weapons, which I cannot cite, at other foreign bases. In addition, we have about 1,000 warheads that can be carried by our bombers. So, Mr. Secretary, the first question I would ask you is this: What is the percentage of total U.S. retaliatory capacity that will be protected by phase I of your program, assuming even though you do not so asume, the system would work perfectly?

What country, in the face of all this devastating, destructive power, would consider that it could launch a nuclear attack upon the United States without suffering utter devastation in retaliation? It would be utter madness.

We foresaw years ago that our strategic bombers were becoming vulnerable and what did we do? We decided to build the Minuteman.

We foresaw the possible vulnerability of the Minuteman, so, despite the great cost, we built a fleet of nuclear missile submarines. We are now in the midst of augmenting our offensive capability by replacing the Polaris missiles with Poseidon missiles.

Now, in spite of the fact that each submarine may soon have the capability of destroying 150 cities and we have now, let me repeat, 41 of these plying the oceans of the world, each one of which can destroy 150 cities, you insist that we must now deploy an antiballistic missile system around two missile sites in Montana and North Dakota.

IS ABM CASE A MERE RATIONALIZATION?

Mr. Secretary, is your case a mere rationalization?

It has been well said that this ABM system is a defense in search of a mission. We have heard every possible kind of argument for it and many of these are contradictory. We were told at first that we had to have an ABM because of the Chinese threat. The Chinese do not even have an ICBM. And yesterday, Mr. Packard said the Chinese were no further along with one than they were 3 years ago. They can't even hit the Pacific Ocean, let alone a missile silo in Montana.

Next it was said that we had to have an ABM because the Russians had an ABM of their own around Moscow. But now it is clear that this system is mostly of the kind that we considered obsolete years ago, and that it has only 67 interceptors to stop our thousands of warheads.

We were told next that we had to have an ABM because the Russians were building a missile defense throughout Russia. But now it is clear that this Tallinn system has no significant capability against missiles.

Until a few weeks ago, or maybe it was a few days ago, we were told by the Joint Chiefs of Staff that our security required deployment of ABMs around 25 or 50 cities to protect our people. Now all of a sudden we are told that defense of the people in our cities is impractical and impossible. Apparently because of a commotion in Boston and Seattle, it is no longer necessary to the security of this country that we protect the people of our cities.

We are told that we must begin to deploy the ABM so that we can test its operational capability, something that can better be done at Kwajalein, where our test facilities are.

Finally, we are told that we have to protect our deterrents, but this proposal, as I have pointed out, would at the very best, or very most, involve only a very small fraction of our nuclear weapons.

Mr. Secretary, if, in fact, this is a weapons system searching for a mission, it surely has not yet found it.

FAVORABLE POSITION FOR ENTRY INTO TALKS

Former Secretary of Defense Clark Clifford, in a speech a few days ago, said: "The hard fact is that we may never again expect to be in as favorable a position as we now enjoy for entry into talks about a freeze in strategic nuclear armaments. Technological developments may well make any arms limitation agreement more difficult to develop and enforce a year from now, or 6 months from now, than it is today."

Now, we have just ratified a treaty, the nuclear Nonproliferation Treaty, which obligates us to enter into good faith negotiations for a limitation of the nuclear armaments race. Ambassador Gerard Smith is now representing the United States at an 18-nation disarmament conference in Geneva. Yet here, another escalation in the nuclear armaments race is proposed.

Therefore, gentlemen of the committee, I suggest that this is a matter of highest priority—the very epitome of our duty and jurisdiction.

We want to know, and we should know why the negotiations have not started. Is it wise to make these talks about our very survival dependent upon a settlement in the Middle East and the solving of the difficult problems in Southeast Asia?

Our real security, let me repeat, our real security rests in stopping the nuclear armaments race, not in promoting it.

Mr. Secretary, and Mr. Deputy Secretary, I appreciate very much your earnest attention.

Senator Case asked to be recognized.

Senator CASE. Thank you, Mr. Chairman.

PURPOSE OF HEARING TO SEEK FACTS

I shall not delay the Secretary or his associates at all, but I just want to underscore the purpose of this hearing as I understand it, along with you, Mr. Chairman.

This is not an adversary proceeding. We are all Americans. We want to find the facts, we want to find the right answers and we are seeking this in a joint operation.

But I think it is fair to say, underlining what the Chairman has said, that we are deeply concerned as to whether this is, as he has so well put it, a system in search of a mission, and in view of its history we think the burden is upon you, sir, to demonstrate that it is not, and that history is not all of our making or of the Nixon administration's making by any means; most of it is not.

And then, as our colleague, Senator Cooper who, because of illness is unable to be with us today, and has left a statement which will be a part of the record, has so well pointed out, we are interested really in this bedrock question: "Is there any credible intelligence of imminent danger or such increased danger * * * to our country or to our retaliatory force that makes it necessary for us to take the first step in the deployment of a new system of nuclear weapons for both area and especially now for missile site defense which," as he says, "if matched by the Soviet Union, as we must expect it would be, will set off an action-reaction pattern between our two countries and vastly expand the nuclear arms race." This is the heart of our question, and I think, therefore, I would say no more.

Thank you.

Senator GORE. Thank you, Senator Case.

The Chair would like to recognize the Chairman of the full committee for a brief comment before yielding to you, Mr. Secretary.

Senator Fulbright?

Senator FULBRIGHT. Mr. Chairman, I am afraid my comments are not so brief on this occasion. I also have been given a statement by Senator Cooper who has taken one of the most prominent parts beginning nearly a year ago on this question of the deployment of the ABM. At the proper time I want to read his statement which he submitted to me and requested that I read into the record.

As a matter of procedure, I wonder if, instead of my taking the time now to make a short statement, we shouldn't allow the Secretary to make some comments and then I would like to come back to questioning after he is through.

Senator GORE. It was my hope that the preliminaries could be concluded in 10 or 15 minutes. We have now consumed that time, so, Mr. Secretary, you may proceed.

Senator FULBRIGHT. I want it understood I do expect to make a short statement and ask some questions a little later.

Senator GORE. It is so understood.

Mr. Secretary, you may respond to the statement that either Senator Case or I made. I might suggest that the very educational and informative hearings of the Senate Armed Services Committee before which you so ably appeared yesterday were widely watched by members of this committee and by the American people. So I would hope that you would not find it necessary to repeat all of those statements, but the committee certainly wishes the administration to have the fullest opportunity to present its justification and its view of this program.

You may proceed.

STATEMENT OF HON. MELVIN R. LAIRD, SECRETARY, DEPARTMENT OF DEFENSE, ACCOMPANIED BY DAVID PACKARD, DEPUTY SECRETARY OF DEFENSE; JOHN S. FOSTER, JR., DIRECTOR, DEFENSE RESEARCH AND ENGINEERING; AND GEN. EARLE G. WHEELER, CHAIRMAN, JOINT CHIEFS OF STAFF

Secretary LAIRD. Thank you very much, Mr. Chairman, and members of the committee.

It is most encouraging for me as a former Member of Congress and now as Secretary of Defense to see a national debate, centering here in the Halls of Congress, on a most important decision affecting the national security and the safety of all of our people.

Yesterday, we did testify, the Chairman stated, before the Senate Armed Services Committee. Today I am pleased to appear before the International Organization and Disarmament Affairs Subcommittee of the Senate Foreign Relations Committee.

Disarmament is a goal that all Americans should favor. For years in the Congress, I have struggled, as you have, Mr. Chairman, and members of this committee, with the burden of having to devote a very substantial percentage of our national resources to expensive weapons systems.

As you know, Mr. Chairman, and members of this committee, I served on the Defense Appropriations Committee for 14 years during my service in the House of Representatives. During most of that time, I was also the ranking minority member of the House subcommittee which provides all of the Federal funds for the health, education, and welfare activities of our National Government. As a result, I am very deeply conscious of the many urgent requirements here at home for the dollars we are spending on defense.

This is why, as Secretary of Defense, I would take great pride and satisfaction in presiding over the elimination of arms building—if we are successful in any future arms control talks. This is a possibility that we pray will become a reality.

I do not, however, intend to preside over any situation that would erode the safety and security of the American people, if we have the means at our disposal to prevent that erosion.

APPROVAL OF MODIFIED ABM SYSTEM

It is in this context, Mr. Chairman, and members of the committee, that the Nixon administration, after a very exhaustive review and extensive deliberations, has decided to propose the Safeguard anti-ballistic-missile defense system for approval in this session of Congress. This approval will be limited to phase I of the program which we will outline in detail before this committee today.

As we propose this modified ABM, let me tell you what it is not. Despite the understandable concern of many Americans, the safeguard system is not an escalation of the arms race; neither is it a stumbling block to arms limitation talks. When understood in its proper context, the Safeguard system is a building block for peace.

I do not make these statements casually, Mr. Chairman. They represent conclusions which are based on long and thorough study and the careful evaluation of technical and intelligence information.

I would like to place into context for you, the overriding considerations that prompted both the top officials in the Department of Defense, the President and his National Security Council to decide to go ahead with a modified ABM system.

Mr. Chairman, as you indicated in your statement, there has been some confusion over the U.S. ABM and its relationship with the overall arms race. It would be useful to look at this issue for just a few moments.

NOT ALL WEAPONS SYSTEMS ARE PROVOCATIVE

Not all weapons systems are provocative. Whether they are provocative or nonprovocative often depends on the character of their deployment. Let me give you an example. Our land-based ICBMs, if deployed in fixed soft positions above ground, where they are vulnerable to attack might provoke a potential enemy into enlarging his own nuclear capability because such a deployment would be useful to us only if we planned to strike first. The reason is that a soft missile deployment would not survive an attack on the United States of the kind the Soviets are capable of launching, and be used for retaliatory purposes. By placing these same ICBMs in protected concrete and steel silos underground—in hardened sites—we demonstrate our own intention to use them primarily for defensive, or retaliatory purposes.

When the Nixon administration took office, deployment of the Sentinel ABM system had been authorized by the Congress, both by the House and the Senate. In addition, construction on this Sentinel system was already in progress with several ABM sites to be located in or near major U.S. cities.

In the discussions which preceded the authorization of this Sentinel system by the Congress, it had been publicly stated that the system did not have a capability of defending our cities against a heavy attack of the kind the Soviets could launch. Ostensibly, this system was designed to afford protection only against a possible Red Chinese ICBM threat.

It was obvious, however, Mr. Chairman, that the Sentinel system was ambiguous, at best. It was interpreted by some as the beginning of a "thick" defense of our cities against Soviet attack. In fact, it

could have been used for precisely that purpose. It could also have been construed as a system designed to protect our cities from surviving Soviet missiles after a surprise attack by the United States.

Our review, therefore, convinced us that the original Sentinel was potentially provocative. As such, it appeared to us to be a step toward, rather than away from, an escalation of the arms race.

EFFECT OF PUBLIC REACTION ON ABM DECISION

Senator FULBRIGHT. Mr. Secretary, would you mind one inquiry about that report? Wasn't it really after the protests in Seattle and Boston and Libertyville that it was suddenly discovered that this was an entirely erroneous system? Isn't that what made you specifically change the decision?

Secretary LAIRD. Mr. Chairman, I would like to direct your attention to the questions which I got into a year or so ago on this particular system when I was a member of the House Appropriations Committee. I think the record speaks very clearly that this was a discussion that went on even before any protest took place.

Senator FULBRIGHT. But the program was proceeding along the other line. The Joint Chiefs clearly had endorsed it, it was underway, they were procuring sites just 2 months ago and suddenly after the protest, which was a very vigorous one, even to a lawsuit in Libertyville, the whole matter was reexamined and a completely different system was proposed. These are facts we are all aware of. I am not aware of all you said in the committee, but this happened in public view; didn't it?

Secretary LAIRD. Mr. Chairman, I would like to——

Senator FULBRIGHT. Go ahead. But the idea that this is all a long and thorough review——

Secretary LAIRD. I would like to tell you that we are going forward in a very important review of our defense posture in all of our weapons systems and in the budget review which I presented to the Armed Services Committee on Wednesday of this week. I think you will find that we have recommended a series of changes in programs.

Now, some of the programs that have gone so far down the line——

Senator FULBRIGHT. I don't wish to go into the whole budget.

Secretary LAIRD (continuing). To make complete changes, but I would be very happy to go into the various changes that our budget review——

Senator FULBRIGHT. I don't wish to do that. I am interested in the very specific point of whether it is or isn't true that just 6 weeks ago the administration was proceeding to acquire sites and install the old Sentinel system; is that not so?

Secretary LAIRD. That is correct.

PROTESTS AND DECISION TO CANCEL SENTINEL SYSTEM

Senator FULBRIGHT. And because of these protests the plans were canceled by the new administration?

Secretary LAIRD. I would like to say that they were stopped because we believe we have a better system, and we would like to have the opportunity of presenting it.

Senator FULBRIGHT. Do you say it is purely coincidental that the decision to cancel the old system occurred with the protests in these three cities? Was it purely coincidental?

Secretary LAIRD. It was coincidental as far as I am concerned, Mr. Chairman.

Senator FULBRIGHT. I only want to know what you thought.

Secretary LAIRD. Because I think we have a better system to propose.

Senator GORE. The committee will be in order.

Secretary LAIRD. Recognizing this fact that was referred to by the Chairman——

Senator GORE. Mr. Secretary, it might be well at this point to indicate when the Joint Chiefs changed their recommendation.

Secretary LAIRD. Yes; I will get into that, Mr. Chairman, in my statement, and I will also get into the question of the cancellation which the Chairman of the full committee referred to in his comment of a minute ago.

Senator GORE. Then the program we are now considering, I believe, was classified as plan B?

Secretary LAIRD. Well, it was alternative B, I think. We presented four specific alternative proposals to the National Security Council, and I can't remember whether it was A, B, C, and D, or 1, 2, 3, and 4, Mr. Chairman, but I think it was the second on the list.

Senator GORE. Perhaps at the appropriate time General Wheeler can tell us when the Joint Chiefs changed their views.

Secretary LAIRD. Yes; and we will get into that, Mr. Chairman.

Senator GORE. Thank you.

REVIEW OF SENTINEL SYSTEM ORDERED

Secretary LAIRD. Recognizing this fact and the fact that the original Sentinel system as it was being installed offered little, if any, protection of our people from a massive attack, I immediately ordered deployment of the system stopped, soon after taking office as Secretary of Defense. I did this so that the entire matter could be studied and reevaluated in terms of its effectiveness, its potential effect on the arms race, and its potential effect on the possibility of achieving meaningful arms limitation talks with the Soviet Union, and I had not been in office very many weeks when this review was ordered by the new administration.

This action was taken with the full knowledge of the controversy that would accompany a new beginning or a change in course. This demonstrates, I believe, Mr. Chairman, the desire of the new administration to prevent any further escalation of the nuclear arms race and to advance the prospects for arms talks with the Soviets.

In short, Mr. Chairman, this should make clear that the new administration has a deep dedication to finding the most viable building blocks for peace.

After our intensive review of all the major aspects of the problem within the Department of Defense, Deputy Secretary of Defense, David Packard, Dr. Foster, the Chairman of the Joint Chiefs of Staff, all the Chiefs, and I, unanimously recommended to the President that

he support the measured, phased ABM system I am discussing before you today. The President, after making his own independent study of the alternatives available with the aid of the National Security Council staff and others, announced his decision last week to urge the Congress to approve the Safeguard ABM system that I will be discussing with you today. This system has been designed to accomplish the following objectives:

OBJECTIVES OF SAFEGUARD ABM SYSTEM

1. It clearly rejects a provocative expansion into a heavy defense of our cities against a Soviet attack;
2. It offers more protection, as needed, to our deterrent forces;
3. It offers protection, as needed, of the entire country from a small attack, such as the kind of attack that could be possibly delivered by the Chinese Communists during the decade of the 1970s or from an accidental launch;
4. It offers the Soviet Union added incentive for productive arms control talks; and
5. It provides the protection needed for the safety and the security of our country—*but only the protection that is needed.*

WHY DEPLOY ABM?

Mr. Chairman, I recognize that our decision to proceed with the Safeguard ABM system raises a valid and relevant question, the question which you raised in your own statement: Why deploy an ABM system at all?

This question is in the minds of many concerned Americans because the facts which provide the answer have heretofore largely remained classified and unrevealed. This decision is so crucial to all Americans, however, that President Nixon and I have decided to make the maximum possible amount of this information public, so that each Senator, each Congressman——

PUBLIC HEARING BY ARMED SERVICES COMMITTEE

Senator GORE. Mr. Secretary, I wish to commend you. I wish to take this opportunity to commend you and the President and the Armed Services Committee of the Senate for holding public hearings because this is a question involving our very existence, our very security. It requires and deserves the fullest possible discussion and involvement of the American people.

Secretary LAIRD. Well, thank you, Senator.

We feel that each Senator, each Congressman and indeed each individual American can have available and should have available, the necessary facts on which to make his or her individual judgment. That is what our system is all about.

Much of the material which we presented yesterday before the Senate Armed Services Committee in an open session and some of the material I will be discussing with your Disarmament Subcommittee today—also in this open session—has previously been classified information.

Because I know perhaps some of you, because of your busy schedules, missed the presentation of Deputy Secretary David Packard yesterday, we have a revised presentation that is a shorter version in case any of the members of this committee did miss that presentation.

Mr. Chairman, simply continuing research and development on the ABM, without any initial deployment, would leave us with no option to provide defense for our deterrent on the schedule that might be required by the Soviet threat if we do not reach an agreement with the Soviets on limiting strategic forces.

The Safeguard system, then, is designed to be responsibe to the threat if and as it materializes.

POTENTIAL THREAT FROM SOVIET UNION

Now, Mr. Chairman, let us examine this threat.

The potential threat from the Soviet Union lies in the growing force of missiles which could destroy a portion of our own deterrent, or retaliatory forces. We cannot stop a massive Soviet attack on our cities——

Senator GORE. Nor on our missile sites.

Secretary LAIRD. Technically—could I explain that?

Senator GORE. Yes.

Secretary LAIRD. Mr. Chairman, I am going to get into that particular question and, from a technical standpoint, I think that we can convince you, Senator, after we present all of the technical information on this question.

Senator GORE. The difference is a matter of degree. If you have, say, 40 ABMs in Montana and the Soviet Union sent 80 missiles to the Montana site, it is only a question of degree. I agree with you that it is impossible under present technology to provide protection and defense that is sure and safe against an all-out Soviet attack on our cities. It is also impossible to protect the Minuteman bases from an all-out attack. So what we are talking about here is a mutual deterrent to starting a nuclear war. What we are trying to examine is how best to do that, but to merely say, as you just said that it is impossible to defend our cities without recognizing also the comparable difficulty of defending missile sites might give someone the wrong impression, and I am sure you did not wish to do that.

Secretary LAIRD. Mr. Chairman, we will get into the question of how to save Minuteman, and the credibility of our deterrence goes to the question of how many Minutemen you can save. It is easier to protect a few missiles in hard silos than it is to protect people in cities and this is the important thing. Our deterrent is based upon the number of missiles that do survive, how many the Soviets or any potential enemy think would survive. That is the context in which I will be discussing the whole question of defense of cities, and defense of our strategic forces.

Senator GORE. I agree that it is easier to defend a specific hard site. But on the other hand, I can't see for the life of me how you or anyone can conclude that in the event Russia should decide to wage nuclear war against the United States, that they would send only a few token missiles over, sort of a powder puff attack. In my view, if we ever face nuclear war with the Soviet Union it will be an all-out attack, not only upon our cities but upon our missile bases, too.

Secretary LAIRD. And we are designing this system so that that won't happen.

Senator GORE. And you are providing——

Secretary LAIRD. And we are going to explain today in our presentation why this system does give us that kind of insurance and why it does protect people and protects the peace.

SMALL PERCENTAGE OF DETERRENT PROTECTED BY SAFEGUARD

Senator GORE. This gets to the gravamen of the issue—you are providing possible protection of a very small percentage of our deterrent power.

Secretary LAIRD. I will get into that by percentages.

Senator GORE. Fine.

Secretary LAIRD. As far as each phase of the program is concerned. I will be delighted to respond in detail to that question. We do get into it in this statement, Mr. Chairman.

Senator GORE. Fine.

I shall restrain myself until you have finished your statement.

Secretary LAIRD. Well, you know, Mr. Chairman, I understand the problem very well.

Senator GORE. You understand the provocations, too. [Laughter.]

Secretary LAIRD. I found though that sitting on that side of the table for 16 years and then coming over to this side of the table—and maybe this is not a fair assessment of the situation—but it now seems to me that it is a lot easier to ask good questions than it is to give good answers. [Laughter.]

Now I have to give the answers. I used to have a reputation of being a good questioner.

Senator GORE. You still have. [Laughter.]

RATE OF SOVIET WEAPON BUILDING

Secretary LAIRD. Mr. Chairman, we must rely on deterrence to insure that nuclear war doesn't start in the first place, and this is the important thing. In order to deter an attack we must be positive—and the Soviet Government must be positive—that a substantial number of our long-range missiles and bombers will survive the kind of attack that you were talking about or any attack, and then destroy the attacker as a modern society. We must have that capability and we must have it in a credible fashion. The Soviet Union today is building at a rapid rate the kind of weapons which could be used to erode our essential deterrent force. They are installing many SS–9 intercontinental ballistic missiles. It is an accurate weapon with a large—up to 25 megaton—warhead. We must give very serious consideration to why this weapon was still being deployed as late as December of this last year. With improvements in the accuracy and a continued increase in numbers, the Soviet missile force could gain real effectiveness against our Minuteman. The Soviets also can build nuclear submarines at a rate of one per month—they are now building seven per year—which could come close to our shores and attack at short range many of our missiles and bomber bases. They are also working hard on a fractional orbit bombardment system designed to reduce the warning time of our bombers so that they will not have sufficient time to become airborne.

This Soviet effort is not just a future potential. As you will recall, former Defense Secretary Clark Clifford, in his posture statement in January, pointed out that in a period of a little more than 2 years, the Soviets had increased their number of operational ICBM launchers more than threefold from 250 in mid-1966 to 896 by September 1, 1968. As of today, the Soviets have in being and under construction more ICBM launchers than the 1,054 possessed by the United States.

The fact that the Soviets have virtually "caught up" with the United States in total numbers of land-based ICBMs has been interpreted by many as a now successful Soviet effort to achieve parity with the United States in strategic defenses.

FACTORS RELEVANT IN DETERMINING PARITY

Of course, "parity" in strategic nuclear weapons, Mr. Chairman, is not a simple function of gross numbers in one category of weapons. Many other factors are relevant in measuring "parity" or equivalence in strategic nuclear power, and, consequently the purpose or capability for which the force is assembled.

For one thing, the destruction which can be accomplished with nuclear weapons depends on many factors other than the number of launchers or warheads. It also depends, for example on the size of the warhead and the accuracy of the weapon. Accuracy, however, is less of a factor in structuring a retaliatory force—strike against cities—than in structuring a first strike force—strike against weapons.

In weighing whether the Soviets are increasing their offensive strategic forces to achieve only parity in deterrent forces, we must take into account the fact that most of the Soviet ICBMs are armed with significantly larger warheads than are the warheads on U.S. missiles. We must compare the 20 to 25 megaton warhead, or the Soviet SS–9, with our own ICBM warheads which are only a fraction as large.

Thus, the Soviets, by deploying as many ICBMs as the United States, can potentially deliver a much larger megatonnage in an attack than we can with our ICBMs.

To keep the discussion in context, however, Mr. Chairman, we must remember that ICBMs constitute only a portion of the strategic weapons of either nation.

RELATIVE CONCENTRATION OF POPULATION AND INDUSTRY

Another important factor is the relative concentration of population and industry within the target country—or, in other words, the maximum number of targets which could qualify for a retaliatory strike.

Former Secretary of Defense Robert S. McNamara in testimony before the Defense Appropriations Committee as well as other committees here on Capitol Hill—and I remember his testimony very well—made an authoritative report to all of us in the Congress in his annual posture statement several years ago on this subject. He gave the relevant information on the comparative concentration of population and industry in the United States and the Soviet Union. This information in the form of tables, was presented in classified form to the committees of Congress in February 1965. I am sure the members of this committee are familiar with those very important tables.

In essence, the studies showed that U.S. population and industry are far more concentrated than are the population and industry of the Soviet Union. To give you an idea of the magnitude of the difference in concentration, Secretary McNamara's studies showed, for instance, that with 1,200 delivered warheads the United States could destroy 45 percent of the total Soviet population. On the other hand, the Soviet Union with 200 delivered warheads could destroy 55 percent of U.S. population. (These figures assume limited fallout protection in both countries.)

In other words, the Soviets, with only 200 delivered warheads could destroy a greater percentage of the population of the United States than our country, with 1,200 delivered warheads, could destroy of the Soviet population. The charts show similar proportions when measuring comparative industrial destruction.

I use these statistics and this material from Secretary McNamara's testimony because I believe it is relevant to our discussion today.

Senator GORE. Senator Fulbright.

RELEVANCY OF POPULATION CONCENTRATION CHALLENGED

Senator FULBRIGHT. You say it is relevant. I don't see that it is. The subcommittee chairman stated a moment ago with our new development we don't have 1,200 deliverable warheads. We have or will have around 8,000. What difference does it make if you draw a comparison when everybody knows we have a higher concentration of population than the Soviet Union? Why is it relevant when we have so many more deliverable warheads? It seems to me it is confusing rather than relevant?

Secretary LAIRD. I certainly do not mean to confuse any member of this committee, Mr. Chairman. I am referring, as I said, to the missile force and that is what we are trying to protect.

When you get into the deliverable warheads which our bombers can deliver you are in an entirely different part of the presentation which we will be making here today, and this is important, because the ABM is designed to give us that important protection that we needed. The chart showing the comparison of missile forces in (see p. 279) our presentation directs itself to that point.

Senator FULBRIGHT. It is designed to frighten the people that we can be destroyed with so few weapons, and that we have nothing comparable. We have more than enough weapons to destroy the Soviet Union many times over.

Secretary LAIRD. Senator, I want to make it crystal clear—and I make this point in my statement, too. I believe the United States today possesses an unquestionable deterrent force. I don't want anyone in this room, in this country or in this world, to question the deterrent force which the United States of America possesses today.

Senator FULBRIGHT. I think that statement does raise some doubt.

Secretary LAIRD. There is absolutely no question in my mind that we have the power, we have the capability as of today. But, as Secretary of Defense, I must be concerned about the time period of 1975 and beyond. In that particular time period, because of the developments that are taking place within the Soviet Union, and because of the increase in the budget for military weapons in the Soviet Union, I am

concerned, Senator. As Secretary of Defense I must be concerned as far as the safety and the security of our people are concerned in the decade of the 1970's.

Senator FULBRIGHT. Mr. Secretary, you are no more concerned than I am and all the Senators here. The question is not whether we are concerned. That is not an issue. The issue is the wisdom of how to protect this country; that is very much the issue. I think in your statement you say population and industry concentration is relevant. That could lead the uninitiated into believing that we can destroy only 45 percent of the Soviets and they could destroy 50 percent of us. That is what I object to.

Secretary LAIRD. I was using the study of Secretary McNamara because I thought it was quite significant to show the differences as far as dispersal of population and dispersal of industry is concerned and its effect upon the two countries. I tried to make that very clear, Mr. Chairman.

Senator GORE. Mr. Secretary, Senator Aiken wishes to make an interjection. I am sure you will not mind.

HYPOTHETICAL FIGURES GIVEN

Senator AIKEN. The figure of 1,200—really a hypothetical figure—but, assuming that it is approximately correct, relates to the long-range ICBMs only and it does include any missiles which could be carried by manned bombers, or the short-range missiles of which we think we have quite a number.

Secretary LAIRD. No, this is independent of how they are delivered. This particular example does not go to the method of delivery. It is independent of delivery.

Senator AIKEN. Yes, but it was a hypothetical figure.

Secretary LAIRD. That is correct, Senator.

Senator AIKEN. Not an actual one.

Secretary LAIRD. It was to show the difference between the two countries. And this is something we must take into consideration as far as any targeting plan that the United States may have in order to keep the peace and to prevent war.

Mr. Chairman and members of the committee, I want to be very clear about what I am talking about. There should be no mistake about our capabilities today, or about the credibility of our deterrent today. We have sufficient strength today in the combination of our strategic forces—our missiles, our bombers, and our Polaris capability—to respond to any attack that might be launched against the United States.

TIME TO NEGOTIATE AN AGREEMENT

Senator CASE. Mr. Secretary, may I just interject at this point that at this moment of parity, if it be that——

Senator GORE. We are ahead.

Senator CASE. I was only using the Secretary's position. And it seems to many of us that this is the ideal time in which to negotiate and agree upon nuclear and other armaments reduction.

Secretary LAIRD. Senator Case, I made it very clear in my opening statement that I hope that I can preside over that kind of an operation as far as the Department of Defense is concerned. I hope we can get

that kind of an agreement. I think all Americans are hopeful of an effective arms limitation agreement.

Senator CASE. I think it is not just a question of hope for the future and the near term, but that we get a meeting now if we may.

Secretary LAIRD. Yes. These treaty negotiations take time, Senator. The nuclear Nonproliferation Treaty took several years. The test ban treaty took several years. I don't want anyone watching us today—I don't want to give them the impression that agreements are just around the corner.

Because it does take long, hard, difficult negotiations. This is something that will take us some time. Those treaties were not as difficult to negotiate as this treaty or as any treaty on arms limitation would be.

Senator CASE. Our concern is that the more difficult it is and the longer it takes, the more important it is immediately to get at the business of starting.

Senator GORE. Senator Javits has a question.

TIME LIMIT ON DEPLOYMENT QUESTIONED

Senator JAVITS. I thank the Chair. I have a corollary question I would not ask otherwise out of turn. But Senator Case, I think, has made a very important point regarding time. Would you mind in the course of your statement giving us your conception of whether we have any time? Your appraisal is that it will take years to negotiate an agreement. On the other hand, it may only take months.

Secretary LAIRD. I would hope it would only take months, but I don't believe we can promise that.

Senator JAVITS. I understand that, but you are the Secretary of Defense, you are not the Secretary of State, and you are not the President, so what I would like to know from you is, under your calculations as Secretary of Defense, do we have any time limit where we could perhaps just wait, 6 months, 2 months, even 30 days? Is there any time limit that we have within which we could negotiate rather than deploy?

Thank you, Mr. Chairman.

Senator AIKEN. Mr. Chairman?

Senator GORE. Senator Aiken.

GROMYKO'S OFFER TO NEGOTIATE

Senator AIKEN. May I interpose there and say it has been 10 months already, from the 27th of June last year that Mr. Gromyko announced the Soviet Union was ready to enter into an exchange of opinions on the mutual reduction of both offensive and defensive weapons, and antimissiles. Have you found in your files anywhere any reason why we did not accept Gromyko's offer to negotiate ABM as well as other weapons last year?

Secretary LAIRD. I am not in the area of foreign policy. The Secretary of State has that responsibility. I feel I have the national security problem to deal with as Secretary of Defense. I was advised by my predecessor when I took over this job, and also was given counsel and advice by the former President of the United States, that the decision was made when the Soviets marched into Czechoslovakia that it was

not the time to go forward with arms control talks. I believe that that decision was made by the former administration, and the decision was related to the movement of Soviet troops into Czechoslovakia. But I am not a qualified witness as to why the planned program of the other administration was stopped. But I was informed by very reliable authority from President Johnson's administration that this was basically the reason that the talks did not go forward.

Senator AIKEN. But the Russian proposal was made 3 days after the Senate voted funds for an ABM system.

Secretary LAIRD. That is correct.

The offer was made 3 days after an affirmative vote in the U.S. Senate for the Sentinel anti-ballistic-missile program. I have not used that in my statement because I did not want to make that the basis for the rationale of going forward with this particular modified ABM system. I believe that this system stands on its own feet, on its own merits. I think that we can convince the members of this committee and the American public that this system rests on that kind of a foundation.

Senator GORE. You may proceed, please.

SAFEGUARDING OUR DETERRENT FORCES

Secretary LAIRD. Mr. Chairman, and members of the committee, we have sufficient strength today in the combination of our strategic forces—our missiles, our bombers, and our Polaris capability—to respond to any attack that might be launched against the United States.

As Secretary of Defense, it is my obligation and my intention to keep it that way beyond any reasonable doubt. This is what the ABM discussion is all about.

And that is why we have no alternative but to protect our options to safeguard our deterrent forces. If the Soviet threat turns out to be, as the evidence now strongly indicates, an attempt to erode our deterrent capability, we must be in a position to convince them that a first strike would always involve unacceptable risks.

As I indicated earlier, the option of safeguarding our deterrent forces against the potential threat cannot be preserved by research and development alone.

Should the Soviet efforts suddenly cease, because of successful arms talks or for any other reason, the options for phased and measured deployment of the Safeguard ABM system would not have to be exercised. In other words, except for work on the two initial sites, our proposed plan for Safeguard permits us to respond to the Soviet threat, not as we project it, but as it develops in the months and years ahead. We neither add to our weapons inventory nor do we incur the costs for a threat that possibly will not materialize.

We will also have a similar option if the Red Chinese ICBM threat develops, to provide protection for our people without deployment around our major cities during the decade of the 1970s.

Mr. Chairman, the estimate of our intelligence community is that the earliest the Red Chinese could have this kind of a capacity would be in the 1972–73 time period, and the estimate is that in the time period of 1975 and beyond, that the Red Chinese could have the capacity and the capability to have 15 or more missiles.

But the question here is that even if they have six—and we are talking about capabilities—this kind of a threat to our cities is an important thing to bear in mind. This particular ABM system gives us the same kind of area protection as the other system approved by the Congress, as far as the Chinese threat is concerned.

SAFEGUARD IS A DEFENSIVE SYSTEM

In summary, the proposed safeguard ABM system is, both in appearance and in fact, a defensive system. In addition, its proposed deployment is phased to the development, rather than any projection of the Soviet and Chinese threats. Our obviously thin protection of our populace and the added protection of our deterrent force will require no reaction at all from the Soviet Union—provided the Soviet Union has a responsible, *deterrent* nuclear war policy, as we do here in the United States.

Mr. Chairman, the Safeguard system is not a stumbling block to arms limiting talks with the Soviet Union. On the contrary; under the type of deployment which we have chosen, the Soviet Union is given an added incentive to negotiate a meaningful agreement on limitation of both offensive and defensive weapons. First, the modified ABM program would show the Soviets that we are very serious about protecting our deterrent forces—about assuring all enemies that they cannot achieve an effective, low-risk first strike against the United States. Second, it would show the Soviets that we are not preparing, for a low-risk attack on them and that it is worthwhile to negotiate limits on strategic arms.

In terms of effect on the possibility of arms talks with the Soviet Union, our decision on the Safeguard system must be judged in the context of the *direction* we are moving, for that is the context in which the world, including the Soviets, must, and apparently, do evaluate our decision.

It is not as if we were starting anew on installing an ABM system. We are recommending that we change from what could be construed by many as a provocative deployment around our cities—the original Sentinel—to a defensive, and clearly nonprovocative, phased deployment. Unlike the original Sentinel, and the Soviet ABM deployment—our direction with Safeguard is away from arms escalation. It underscores with action our avowed desire for effective arms limitation talks.

EFFECT ON ARMS CONTROL TALKS

In addition, under the proposed Safeguard program, even the first two installations will not be operating before 1973. This gives ample time for the two countries to negotiate agreements on these and other weapons. Thus, the modified ABM opens the door wider to mutual arms control.

But if the Soviets should slam the door on an agreement, the modified ABM would permit us to continue steps toward protection of our retaliatory forces. This option, Mr. Chairman, would be more important than ever before, because we would have to assume that a Soviet rejection of meaningful negotations would demonstrate a Soviet

determination to continue to build toward a low-risk, first-strike force.

The public Soviet reaction to President Nixon's announcement of a week ago is encouraging, however. The Soviet press indicates that its Government correctly views the modified ABM as a purely defensive weapon.

To restate what I said at the outset, all Americans should favor effective arms control agreements at the earliest possible time.

I congratulate the members of this Disarmament Subcommittee on its constant and its diligent efforts to contribute to the goal of arms control.

Peace, after all, is not only our objective; it is our solemn responsibility Mr. Chairman. The system we are proposing is the best kind of people protection because it strengthens our ability to deter war. To the extent that it does that, it can truly be called a building block for peace.

Mr. Chairman, Deputy Secretary Packard is now prepared to present a detailed briefing on the safeguard ABM system, after which we will be prepared to respond to your questions.

We would like to present Dr. Foster and Deputy Secretary of Defense Packard to discuss the technical capabilities of the system. But before we do that, I would like to just briefly answer three of the questions which you asked me that were not answered in the formal statement.

COMMITTEE QUESTIONING PROCEDURE

Senator GORE. May I interject?

The subcommittee has not determined by consensus of the members the procedure, but several members have indicated a desire to interrogate you following your statement, and I shall defer my own questions until each member has had an opportunity. We have not agreed upon a time schedule, but unless there is objection from some member of the committee, each member will be recognized for 10 minutes. Before we start on that, you will have full opportunity to respond to the statement I made.

PROTECTION TO MINUTEMAN ARSENAL

Secretary LAIRD. First, Mr. Chairman, you asked me to state for the committee what protection to our Minuteman would be involved if only phase I, the two sites in the Minuteman missile fields, are deployed and operational, and this would not be until 1973 at the earliest.

This phase I deployment would provide a light cover to virtually all of our Minutemen.

A heavy cover would be provided to roughly one-third of our Minuteman missile force.

Senator GORE. This is about 330 to 350?

Secretary LAIRD. That is a heavy cover.

Senator GORE. Yes.

Senator CASE. I wonder if you could just describe what you mean by a light and heavy cover. It is very difficult for people to understand just what you mean when you say a light cover and how something could be a light cover and not be a heavy cover.

Secretary LAIRD. Well, in our presentation today, we do go into this in some detail and explain the difference between a light cover of a missile field and a heavy cover of a missile field. We can do that right now, however, if you would like us to.

Senator FULBRIGHT. Mr. Chairman, the Secretary has taken almost an hour, 55 minutes, and now you have announced a 10-minute rule which makes it utterly impossible to ask the Secretary anything of any significance. I don't think this is anything but a parade of the Secretary's previously expressed views and I don't think we have accomplished anything.

Senator GORE. The Secretary has asked to respond to my statement. And I think he should have that privilege.

Secretary LAIRD. Well, I have had experience in these things, and I have learned that you don't want to antagonize the members of a congressional committee. I will yield to the Chairman of the full committee if he would rather have me respond at a later time to these particular questions.

Senator GORE. The committee is subject to your wishes in that regard.

Secretary LAIRD. Does Senator Case wish me to explain?

Senator CASE. If that can be done in a sentence or two, that is all, so that your statement can be more meaningful.

Secretary LAIRD. I am sure this will be cleared up in our presentation. We will go into detail later.

Senator GORE. If you will please make such response as you desire to the opening statement I made and then the Chair will recognize Senator Fulbright.

SHIFT AWAY FROM CHINESE PROTECTION

Secretary LAIRD. Mr. Chairman, you asked why we shifted away from the Chinese protection which was used as one of the major reasons for the Sentinel system previously approved by the Congress. I would like to state that we have not shifted away from protection against a possible Chinese threat during the decade of the 1970s.

This system, when fully deployed and operational, would give the same area protection that the previously approved Sentinel system would have given against the Chinese missile threat during the decade of the 1970s.

As you know, Mr. Chairman, I questioned, as a member of the other body, whether the Chinese would have this capability when Secretary McNamara was before our committee. I have found out since assuming the office of Secretary of Defense that Secretary McNamara was right, and that I was wrong.

Our intelligence community is unanimous in its belief that the Red Chinese do possess the capability to have a force of ICBMs operational by 1975, and could have it initially operational in the late 1972 period. We believe, on the best information available to us—and we have very good information in this area—that the Chinese will fire a test ICBM within the next 18 months.

Mr. Chairman, we have not eliminated that capability for area protection against a Chinese strike on our cities.

We do not believe that the Chinese would launch a massive strike against our missile bases, but we cannot be sure of the rationale of the Chinese in this particular area. We might very well, in the arms limitation and arms controls talks which may take place in the near future, get into an agreement with the Soviet Union where we both would want to deploy and have operational some sort of an ABM system for protection against this possible Chinese threat.

Senator GORE. The Chair will recognize Senator Fulbright for 10 minutes in his own behalf and 10 minutes in behalf of Senator Cooper, who is ill, but, fortunately, improving.

Secretary LAIRD. Mr. Chairman, would you rather go into questions before we present the technical capabilities of the system?

Senator GORE. Members have requested the privilege of interrogating you briefly before we go into the further general statement.

Senator FULBRIGHT. Mr. Chairman, the Secretary obviously is a very experienced man in these matters and he has occupied now 1 full hour which leaves us very little time. I protest that 10 minutes is not adequate to even begin to ask questions. Rather than to ask questions, I would like to make a few observations for whatever they are worth because I read practically everything the Secretary said yesterday in the paper this morning. In fact, I also happened to have heard this explanation last week, so there is nothing new about it.

MORE WEAPONS TO INCREASE SECURITY QUESTIONED

At the last hearing, the Secretary reiterated these statements about how as Secretary he had a special responsibility for our defense and our security, and he seems to believe that, having become Secretary, that he has acquired in some mysterious way a very special understanding and appreciation of security. I reject the idea. I reject the idea that he is more concerned than the members of this committee.

On more than one occasion, I have heard it said by and about him that if he were to err he insists that he err on the side of strength of national security. This view, it seems to me, assumes that more weapons, more missiles, weapons, guns, FOBS, and MIRVS necessarily, without question, are the equivalent of more strength and more security. I wish to assert that this view is not self-evident nor necessarily true.

In fact, under present conditions in the world and in our own country, I believe that the continued buildup of arms of all kinds and the continued neglect of the needs of our people will certainly lead to a loss of our most cherished institutions, of our security in the truest sense. In short, Mr. Chairman, more armaments in view of the enormous stockpile we already have, degrade and threaten our security rather than enhance it. This is one of the central issues. This assumption that more weapons necessarily and obviously and unquestionably increase our security is not true.

I don't think you are a bit more interested in our security than I am or are the members of this committee.

The only question is whether or not this proposed system is wise and whether it enhances our security.

There are a few other observations.

TRUTH OF CLASSIFIED INFORMATION

In your statement there is a great deal made about declassifying information. We have had experience about this before, and I only wish to observe that the mere fact that information has been classified does not make it necessarily true. [Applause.]

We had this same question in our hearings on the Tonkin Gulf.

Secretary LAIRD. Mr. Chairman, can I respond to that?

Senator FULBRIGHT. Yes indeed.

Secretary LAIRD. I hope that the intelligence estimates that go out to the 1975 time period turn out not to be true, Senator Fulbright. I would hope and pray that they would not be true, but I cannot assume that the intelligence community estimates are untrue today, because as you know, they are our best projections of the capabilities and of the probable position of the Soviet Union in the mid-1970s.

Senator FULBRIGHT. This prompts a further observation.

In discussing the Russian military capacity, they suddenly become men 10 feet tall. They can do all sorts of things: their skill and talents are almost unbelievable. Yet when we discuss them as a society, they are inadequate in practically every respect. The military always depicts the Russians as about to overwhelm us.

This, of course, I suppose, is part of the technique of salesmanship.

But it gets a little old. Time after time in the so-called posture statements by Secretaries McNamara and Clifford it is clear that in numbers and deliverability of our weapons we are so far ahead of the Soviets. Of course, they are trying to catch up. I don't see how anybody can assert that they are either equal or ahead of us.

But this is a kind of fear technique that is supposed to precipitate congressional acceptance of these great programs.

Mr. Chairman, I would like to ask a lot of questions, but I don't like to ask a question and have the Secretary take up the full 10 minutes in an answer which he is quite capable of doing. [Laughter.]

I want to just make a few comments. As I say, I have already been briefed privately and publicly by the Secretary and also by Mr. Packard, so you will excuse me. I read this testimony yesterday, and heard it this morning with great interest, but also with great dismay.

CHANGE IN VIETNAM POLICY URGED

The Secretary has just returned from what I assume is a very thorough and exhaustive and in-depth study of Vietnam. We all know that this particular problem of the ABM and armaments in general cannot be disassociated from our tragic involvement in Vietnam. The Secretary, better than anyone, is now in a position to evaluate Vietnam, and I simply want to make a few simple representations about it for whatever they are worth.

It is now, Mr. Secretary, 4½ months since the election last November and 2 months since the inauguration of President Nixon. The election of Richard Nixon as President was, I believe, a positive expression by the American people that they desired a new and different policy in Vietnam, regardless of what other changes they may wish to have in foreign or domestic policy.

In 1964 the people by a very large majority voted against expansion of the war in Vietnam, in accordance with the professed policy of the then Democratic candidate.

If after twice voting against ever-increasing warfare, and ever-increasing militarization of our national life and still being unable to bring about a change in policy, the American people, I fear may indeed lose their confidence in our democratic system.

They might conclude that the government is no longer responsive to the will of the people and they may lose interest in its preservation. I am very interested in its preservation.

So I plead with you, Mr. Secretary, not to delay too long to bring about a change in policy which this administration inherited. That is why you are very fortunate. If this administration continues and escalates this war in Vietnam it will soon be Mr. Nixon's war and there will be little chance to bring it to a close, short of a major catastrophe. For more than 5 years, Mr. Secretary, this committee has heard Secretaries of Defense and State and numerous generals and ambassadors tell us and the public a succession of varying and different stories about success and failure in Vietnam, about bringing the troops home soon, and about remaining for a very long time in Vietnam. According to circumstances the accounts change so that neither the Congress nor the public can ever quite decide what the situation really is. It is like a moving target, a sleight of hand performance, fleeting and elusive so that no one can ever really come to grips with it.

Admiral McCain, who is commander of the Pacific Fleet, in an interview approved by the Pentagon, made the flat statement in last month's Reader's Digest that we have licked the enemy in Vietnam. Your report from the generals presents quite a different picture.

So how can we believe either version?

Surely, Mr. Secretary, this administration will not continue this dangerous and tragic game which cost some 350 lives last week and fantastic amounts of the wealth of our country so that inflation and disillusion and violence threaten the security of everyone.

Isn't it possible, Mr. Secretary, to recognize that we are not now, and never have been, winning this war in Vietnam, that the expansion of that war in 1965 after the election of 1964, was a tragic mistake in judgment by the then administration, and contrary to the desires of the American people as expressed in the election of 1964?

Now, to rectify that mistake, by deescalating and settling this war would not only be a great and genuine service to the American people but I am quite sure that it would also be good practical politics. I can't understand why this administration, made of politicians, is so reluctant to play politics with this issue.

That is a statement. I haven't asked a question.

Secretary LAIRD. Could I respond to that last question?

Senator FULBRIGHT. Yes.

Senator GORE. Under the equal time provision, the Secretary is recognized.

U.S. ENGAGED IN PEACE TALKS

Secretary LAIRD. Well, Mr. Chairman, I would just like to say that this administration is committed to end the war in Vietnam. We are presently engaged in very important peace talks in Paris.

Senator CASE. May I interrupt? I think it is important to remind everyone and ourselves that last week Senator Mansfield said he was quite sure President Nixon would give his right arm for peace in Vietnam, so there is no question about the dedication of this administration to that cause.

Secretary LAIRD. There should be no question about the President's dedication. But the point is, Mr. Chairman, we are presently engaged in very important talks in Paris. I came back and gave a report on my recent trip to Vietnam to the Senate Armed Services Committee on Wednesday of this week. I did not pose as an expert. I did not make predictions or prophesies. I tried to assemble as many of the facts as I possibly could in Vietnam while I was there. I want you to know that we are hopeful that we will be successful in the talks that have gone forward in Paris. But if we are not successful, and we pray for success, I can assure you that we will have an alternative as far as the war and the present conduct of that war is concerned.

But I do not believe that it serves the interests of this Nation or the cause of peace in Southeast Asia to carry on our bargaining or our negotiations in public at this time. I can assure you that every effort is being made not only through diplomatic channels, formally in the Paris peace talks, but privately as well. I do not believe that this is the place or that this is the time to carry out those kinds of negotiations and that kind of bargaining in public.

ESCALATION INCONSISTENT WITH PEACE TALKS

Senator FULBRIGHT. Mr. Secretary, I have heard this before, and I accepted it for a while, but independent evidence is not consistent with this whatsoever.

After your meeting with the Armed Services Committee on Wednesday, Senator Stennis, the chairman of that committee, summed it up, I think, by a very ominous statement saying, "Well, it is quite evident from the Secretary's report that we will be in Vietnam a long, long time." And everything that was said and was reported in the press indicated that there is not any reasonable hope on your part or your generals, that there is any prospect whatever of ending the war, and the escalation of the fighting is also, in my view, quite inconsistent with it.

The history of the escalation since the bombing halt, in my view, is inconsistent with the idea that there is any movement or in any sense a desire to really seriously talk peace under present conditions, each side thinking that it is going to get stronger and negotiate from strength. This has been the illusion for several years, this is a replay. This is such an old broken record we have heard since the days of McNamara.

I am not being personal with you. This is not new, that is what disturbs me. If this were the first time the Secretary of Defense had come and given us these nice statements, I would be as gullible as I was then and accepted it, but it just is not true. It has not been proved true. We are in serious difficulties here at home, and I do not blame you for the various troubles that afflict this country, but I think we are in serious trouble and all of them do affect security. I am very apprehensive, though you say we should be content, about your saying there are

prospects of private talks. Everything that appears in the press, or I have heard privately, denies the idea that there are private talks proceeding. The escalation, the increased losses of lives, this dreadful loss of 350, it was 400 a week or 2 ago, this enormous expenditure, with growing inflation, and growing dissatisfaction all create a very ominous picture.

ABM IS ONLY PART OF WHOLE PICTURE

All I am pleading with you is not to be so bemused by ABM. After all, the ABM, whether it works or not and I do not think it will, is going to cost $6 billion. You could do a lot with $6 billion, and this is in addition to about $80 billion you already are spending on defense.

It is the whole picture, not just ABM, that this committee and the Congress have to look at.

I am not trying to be critical of you. I am suggesting that you, being free from past mistakes, could be a great hero and so could President Nixon, if you would turn this thing around. But time is going by. If you do not turn it around, it is going to be your war, then your own pride will enter the picture. It is not the honor of the United States that has been involved in this. It is the honor and prestige of the men who make the decisions. It was President Johnson's reputation, that is why he resigned; he did not run again. It is not the United States that is going to be disgraced. The people of the country have not really wanted this involvement. In fact the people of the country have voted twice to follow a different policy. They have been right, in my opinion, but their leaders have been unable to translate it.

I think you have good intentions, but I think you have to do something radical to change this situation or this country is going down the drain. It is a terrible situation.

Secretary LAIRD. Could I comment on the first statement, and then I would like to comment on the second statement made by the distinguished Chairman of the Foreign Relations Committee.

CONDUCT OF WAR SINCE JANUARY 20

First, Mr. Chairman, I want to make it crystal clear that since the new administration took office on the 20th of January, 1969, there has been no escalation of the war as far as the United States and the South Vietnamese are concerned.

Senator FULBRIGHT. You say since you took office.

Secretary LAIRD. The only escalation that has occurred as far as the war is concerned has come from the Vietcong and the North Vietnamese, and I think we should understand that.

Senator Fulbright is critical of me for not bringing a more optimistic report to the Congress.

Senator FULBRIGHT. Do not misunderstand me. I do not want you to bring a false one. I just want a full one. I was not asking that you tell us the men will come home for Christmas unless we do something——

Secretary LAIRD. I tried to stay away from that, Senator Fulbright. I did not want to be a hero when I came back, and maybe what you have to have is a very fine, flowery report. But I tried to give to the Armed Services Committee a factual report as to our position in Vietnam at the present time.

I believe that this current Communist offensive will be a failure, but I do believe that we have not moved forward as rapidly as we should have in changing the conduct of this war and in shifting the responsibility of this war to the South Vietnamese forces.

In my appearance before the Armed Services Committee—and I will give you the detail of that appearance, both the closed testimony and also the open testimony—I pointed out that we needed to go forward with this phase 2 modernization program and fund that program. If we go forward with that program and upgrade the capability of the South Vietnamese forces, I believe we can reduce the casualties of Americans, we can reduce the commitment of Americans, and we can reduce the involvement of the United States of America. And that is the program and the increased funding I recommended in the amendments to the fiscal year 1969 and fiscal year 1970 budgets that I presented to the Armed Services Committee on Wednesday of this week.

Senator FULBRIGHT. My time is up, Mr. Chairman, and I regret it. It has been said that the administration had a plan for ending the war. I am not at all sure such a plan consists of negotiating a settlement which is necessarily in the nature of a compromise. This may be one of the reasons why no progress is made. I am only saying that one of the things I expected and the American people expected was that this administration would do whatever it took to end this war, and to make an adjustment. We do not expect miracles, but only to make an adjustment perhaps along the lines of the often-mentioned Geneva accords.

Mr. Chairman, Senator Cooper has some material for the record. Will you see that it is put in the record? Or I will do it later if I have an opportunity.

Senator GORE. The Chair must hold that Senator Fulbright has used his 20 minutes without referring to Senator Cooper's questions. I will take the responsibility for putting them in the record at the appropriate time, but the Chair feels he should recognize Senator Case. (See p. 235.)

Secretary LAIRD. Mr. Chairman, could I just make one comment——

Senator GORE. One comment and let us conclude this and go to the ABM.

ABM INSIGNIFICANT COMPARED TO ENDING WAR

Secretary LAIRD. I just want it understood that I concur with the statement made by Senator Fulbright that the ABM question is really insignificant as compared with ending the war in Vietnam. We are committing a great deal of our resources to the war in Vietnam. We are committing, in the year in which we are in, almost $30 billion. The Soviet Union committed perhaps $2 billion. It has given the Soviet Union an opportunity to go forward in the strategic arms area while we were tied down in the Vietnam conflict. But this hearing on the ABM was called, not by me, but by this committee. I do not want to give anybody the impression that I believe the ABM is the most important decision or problem facing me or facing the Department of Defense. The most important problem facing the Department of Defense, this whole administration and the country, is the war in Vietnam, and this is understood completely, fully, and adequately by our President.

Senator GORE. The Chair would like briefly to observe that the Vietnam issue is certainly not irrelevant to the ABM issue because the whole philosophy of attempting to settle political problems by military means places strength ahead of political processes and is involved in ABM and in Vietnam.

Senator Case?

Senator CASE. Thank you, Mr. Chairman.

I know the Secretary was using this form in expressing his great concern about the war in Vietnam but I assume it doesn't mean that he doubted the essentiality of ABM, and if so this is precisely the matter that this subcommittee is interested in.

Secretary LAIRD. Yes. I just wanted to make it clear that I certainly concur with Senator Fulbright's comment that the problem of the war in Vietnam is the major problem that we face in the Department of Defense and in the country. I didn't want to give the impression that there was any disagreement between Senator Fulbright and me on that very important issue.

IS ABM ESSENTIAL TO OUR SECURITY?

Senator CASE. I want to underscore this because I regard it as the heart of our inquiry. Is this ABM essential for the security of our population and our deterrent? I think this is terribly important in many ways. For example, if, as some people would have it, we are still seeking a justification for something that was suggested by Secretary McNamara for whatever purpose at the end of his remarkably clear statement of September 1967 on the inefficacy of a general antiballistic missile system, we ought to know that and that is really what we are after. In a way it seems to me very unfortunate that the President says what we are talking about now is just a method of defending our nuclear deterrent, and its credibility.

I can't imagine, for example, that if this is an essential thing the citizens of Chicago, of Boston, of Northern New Jersey communities would themselves refuse, even though they didn't like it, to have the ABM system deployed right there where they live and work.

It is only the doubt as to the efficacy of this system and as to its essentiality that has led them to protest and representatives of those areas, especially members of the House, have made this very clear themselves on many occasions.

I can't imagine this administration, if it thought that this was an essential system and efficacious for its purpose, would have permitted protests from a locality, that is to say domestic political considerations to deter it from placing those missiles where they thought they ought to be.

Secretary LAIRD. I thought I made that very clear, Senator Case.

Senator CASE. Perhaps you did but there have been many people speaking about many things since that statement, and in some fashion, I think it is very useful in direct colloquy to point up some of the essentials of the matter.

We want to hear Secretary Packard very much and Dr. Foster as well as your own testimony because we want to know really what the facts are.

Secretary LAIRD. We would love to explain the whole system.

Senator CASE. And this is what we want. Is this necessary as opposed to being only marginally important?

Secretary LAIRD. Could we go through this presentation for you, Senator Case?

Senator CASE. Oh, yes, I am looking forward to it and either on your time or the subcommittee's time or—but I am waiting for the facts of the situation. It seems to me we have had a deluge of *a priori* arguments.

Senator GORE. Senator Church.

Senator CHURCH. Thank you very much, Mr. Chairman.

INCONSISTENCY IN RATIONALE ABOUT CHINESE THREAT

Mr. Secretary, I have been listening very closely to your remarks this morning, and I am bothered by what strikes me as a possible inconsistency in the rationale that you have advanced. You have said, as I understood it, that by 1972 or perhaps by 1975 it is possible that the Chinese may have as many as 15 ICBMs, and then you went on to say that even, if they had only six, the ABM system you are proposing could provide some protection against an irrational Chinese attack. Is that a fair summary of your position?

Secretary LAIRD. Senator, I merely was referring to capabilities in the future.

Senator CHURCH. I understand.

Secretary LAIRD. Having sat on the Defense Appropriations Committee and watched these estimates for the 1975, 1976, and 1977 time period, I don't want to get into the numbers business, whether it is six, 10, 15 is not the main point; the intelligence community estimates many more than six.

Senator CHURCH. I understand that. I don't want to get into the numbers game either, Mr. Secretary.

Secretary LAIRD. But the point I was trying to make, was that even a six-missile deployment—and the intelligence community says it will be greater than that—six would be enough from the standpoint of nuclear blackmail threat to one city or two cities in America. I am not sure of the rationale of the Red Chinese, and I was merely pointing to the fact that the system that we recommend has the same capability for area defense as the original Sentinel system against a Chinese attack of small numbers. It doesn't have a good defense capability against large numbers of missiles except in the Minuteman fields and except in certain other selected areas. That is the point I was trying to make.

Senator CHURCH. I think I did understand your point, and there is no confusion on that score.

What I wanted to get to was this: Isn't the whole deterrence theory based upon the assumption that nations will act rationally, that is to say, that they will not choose to commit suicide?

Secretary LAIRD. That is what this ABM system is aimed at, too, as far as the Soviet Union is concerned.

Senator CHURCH. I understand.

Secretary LAIRD. As far as the Chinese are concerned we get into a different area, a different problem.

Senator CHURCH. Why?

Secretary LAIRD. I am not an expert on judging the rationale that the Chinese may use at some later date.

Senator CHURCH. You mean you think the Chinese might be irrational while the Russians can be depended upon to be rational?

Secretary LAIRD. I think the Russians have been living with and understanding this nuclear armament business for a long period of time. I think that they are in a much better position to look at this situation rationally than perhaps the Chinese who will not have a capability for any kind of a major strike in the foreseeable future. I do not believe that the Chinese will have a capability for a major weapon deployment before the 1980s. But they do have the capability for a limited deployment. If they are going forward with a limited deployment, I have to consider why they are going forward with this limited deployment in the 1970s.

DETERRENT SYSTEM DEPENDS ON COUNTRIES ACTING RATIONALLY

Senator CHURCH. My point is this, Mr. Secretary: it seems to me that if the Chinese, even under the most pessimistic projection of our intelligence estimates, will have what would have to be regarded as an extremely limited capability of attacking the United States, that even to the Chinese it would be apparent that such an attack upon us would be utterly insane. It would result in the total incineration of China.

If we are building a deterrent system, it is going to work or it is not going to work, depending upon whether other countries, knowing our capability, react rationally. If they are not going to react rationally the whole system isn't going to work. That is why it disturbs me very much when I hear someone in your high office suggest that we are building a deterrent system against the Russians on one theory but against the Chinese on another, because if we proceed upon the assumption that the Chinese may be less rational than the Russians, then as their capability increases, we might well start building an elaborate defense system of the kind you, yourself have testified against.

Secretary LAIRD. No, I would not agree with that at all, Senator.

Senator CHURCH. I see a great inconsistency.

Secretary LAIRD. I would not agree with the premise upon which your are proceeding. Even if the Red Chinese were to go forward with an elaborate missile system comparable to the Soviet Union's, we would still have the same type of protection of our missile forces in this phased Safeguard ABM program for an elaborate Chinese system that we have for an elaborate Russian system, and this would give credibility to our deterrent. This is people protection, because in order to maintain peace and to stop nuclear war we need to have a credible deterrent and any adversary must know that we have that deterrent.

Senator CHURCH. Mr. Secretary, it simply bothers me very much to hear an argument made that we think the Chinese may be irrational, when obviously the whole system of deterrence is either going to work or not going to work depending upon the rationality on the other side.

Secretary LAIRD. We want it to work.

Senator CHURCH. That is right, we want it to work. That is why I think separating the Chinese out and treating them as irrational is inconsistent.

Secretary LAIRD. Well, I am not trying to make a separate argument on that, Senator Church. I merely listed it as one of the five objectives of this particular system. We gain protection on an area basis only after all 12 sites are deployed in the United States. I want to make that very clear. In order to provide an area defense of the United States, all 12 sites must be deployed just as all the sites had to be deployed under the Sentinel system that was mainly oriented toward the Chinese threat.

These two sites give us protection against a Chinese threat in the areas of the two Minuteman sites but not all over the country. We have heavy protection for one-third of our Minuteman force and I do not want to mislead this committee or you, Senator Church, in any way, regarding this matter.

IS ABM DEPLOYMENT INCONSISTENT WITH ARMS CONTROL?

Senator CHURCH. As you know, Mr. Secretary, we have just ratified a Nonproliferation Treaty in the hope and expectation that this might slow down what could be called the horizontal proliferation of nuclear weapons.

Beginning now the deployment of an ABM system might fairly be described as a vertical proliferation; it is adding a new layer. In view of our attempt to slow down the horizontal proliferation, don't you think the position of the Government becomes inconsistent when it then advocates the deployment of a new system that constitutes vertical proliferation?

Secretary LAIRD. Senator Church, in my statement, I tried to make clear that we were pleased with the response which we had in the Soviet press to the modified ABM system that has been announced by the President. I believe that it will be an incentive to go forward with arms talks.

I would like to just quote from the press conference that Premier Kosygin held in London on the ninth of February 1967. He was asked a question "Do you not share the opinion that the development of the Soviet antimissile system is a new step in the arms race?" And this is what you are talking about right now, the question that was directed to Premier Kosygin. He replied, and I quote:

"Which weapons should be regarded as a tension factor—offensive or defensive weapons? I think that a defensive system which prevents attack is not a cause of the arms race but represents a factor preventing the death of people."

Now, that is the end of the quote.

My point, Senator Church, is that I appeared before this committee in support of the Nonproliferation Treaty. I am well familiar with section 6 of that treaty, and I can assure you that I do not believe that this measured deployment program, this phased initial deployment, in any way jeopardizes realistic or effective arms talks. I believe that it will be a further incentive for discussions on the limitation of both offensive and defensive weapons.

ASSURANCE AGAINST THIN SYSTEM THICKENING

Senator CHURCH. I certainly hope that proves to be the case, Mr. Secretary. My time is up, and I just conclude by asking one final question: What assurance can you give us that this thin ABM system you are now proposing, this "measured, phased" system, as you have described it, won't grow inexorably into a thick system?

Secretary LAIRD. Senator Church, this cannot develop into the thick system surrounding our cities that the other proposed Sentinel system could have developed into. A thick system would require different sites than the ones we have chosen. Whether a thick system will ever be developed and deployed in this country, is a question that is open to future Secretaries of Defense and to future Congresses.

I have always trusted the Congress of the United States to make the right decision. I have been a part of that Congress, and I think that the role of the Congress in this decisionmaking process is just as important as the role of the executive branch. I have argued this for years, and I can only say to you, Senator Church, that I can put my faith and trust in this representative government of ours, and I think it will make the right decision not only now but in the future.

Senator GORE. The chairman has concurred with Senator Case, the ranking minority member of the subcommittee, and with Senator Fulbright, chairman of the full committee, and we have concluded and agreed that since the subcommittee is honored with the presence of some of our distinguished colleagues on the full committee that it will be proper to recognize them in the order of their seniority on the full committee. So the Chair recognizes Senator Aiken.

MOSCOW-WASHINGTON SUMMIT MEETING

Senator AIKEN. Mr. Secretary, do you believe that a summit meeting between Moscow and Washington will be very helpful before an understanding has been recommended at the lower level of the government?

Secretary LAIRD. Senator Aiken, as Secretary of Defense I do not want to transgress upon the responsibilities of my friend and colleague, the Secretary of State, Bill Rogers. The Defense Department is sometimes criticized for getting into the field of foreign policy. As Secretary of Defense, I have religiously tried to avoid that, and I have kept in close consultation with the Secretary of State. I believe that if I answered that question, within the next day or two, I would be accused of trying to wear two hats, Secretary of State and Secretary of Defense. I don't want that to happen in this administration.

Senator AIKEN. The Secretary of State has a pretty large hat and a pretty knowledgeable head under it. I ask you that question simply because I assumed you would be interested and would probably serve as consultant sometime during the proceedings.

Secretary LAIRD. Do you want me to give my opinion on the question? I would be happy to do that.

Senator AIKEN. As a citizen.

Secretary LAIRD. I want it to be fully understood that I am talking as Secretary of Defense. I don't want to be accused at some later time of getting into the foreign policy area and transgressing upon the

responsibilities which have been assigned by the President to the Secretary of State.

Senator AIKEN. Of course, that has never been done, anyway. [Laughter.]

Secretary LAIRD. Senator Aiken, I believe that before there is a summit meeting it is always best to have some kind of an initial understanding or agreement in prospect.

I have always been in favor of talks, and I think talks are important between friends, first, and then with any potential enemy. I think that this administration has proceeded wisely and well in making its first approach to our friends. After those approaches have been made to our friends they will be made to some of the other nations and some of the other leaders of the world. But the timetable on that is a matter that should be left up to the President of the United States. It is not a responsibility that I should have as Secretary of Defense.

Senator AIKEN. You have practically usurped my final statement. I feel that for the first time in years progress is being made toward reaching an understanding not only in regard to armaments and ABMs but other matters of mutual concern between the nations. I also feel that any further questions which I might ask at this time would not be helpful in reaching the objective which we all have. That is all.

Senator GORE. Senator Symington.

Senator SYMINGTON. Thank you, Mr. Chairman.

FIRING MINUTEMAN INSTEAD OF SPARTAN

Mr. Secretary in listening to the discussion today and yesterday, apparently you believe no PSI [pounds per square inch] could protect a Minuteman from a Soviet SS–9. Presumably your gyros would be functioning, so all you would have to do would be open the lids, after the PAR finds the incoming missiles. Why then couldn't you fire the Minuteman on target instead of the Spartan?

Secretary LAIRD. Well, Senator Symington, I would just like to say, as I am sure you are aware, that our Minuteman missiles are not designed to serve as ABMs. I would like to have Dr. Foster comment on the technical aspect of that question. Dr. Foster.

Dr. FOSTER. Certainly, as Secretary Laird has indicated, the Minuteman does not have capability to receive instructions from a radar to guide it to a predetermined impact point, and as a consequence the Minutemen that we now have deployed are not useful for that purpose.

Secretary LAIRD. I would also like to have General Wheeler comment on that question because I think it goes to the actual——

Senator SYMINGTON. I don't want to lose too much of my time. I would say to Dr. Foster that some of the people who have the same eminence in his profession as he disagree with his answer; but I would ask another question if that is his answer.

Dr. FOSTER. If I may reply to your remark, Senator Symington, about 6 years ago I looked into that one personally. Like most of the other scientists, I thought I had invented something new. It turns out it isn't practical, in my opinion. It is something we could do, but in doing it you would be taking Minuteman away from the job they are now assigned to, modifying them, and permitting them to act in another role.

Senator SYMINGTON. Apparently we are going to modify them a lot anyway. I noticed the Brookings Institution report by former Director of the Bureau of the Budget Charles Schultze says we are going to spend $4,600 million, to the best of his knowledge, modifying the Minuteman II and getting Minuteman III.

POSSIBLE THREAT TO POLARIS

Mr. Secretary, yesterday, I asked you about the Polaris, because of apparent current apprehension about the Polaris being in grave danger in the not too distant future. You said further discussion should be reserved for executive session, to discuss why the Polaris would be in danger from enemy action in the not too distant future.

I accepted that, but notice the following in the press this morning:

"The first counterforce weapon aimed at our Polaris submarines is the nuclear powered and extremely speedy SSN attack submarine. These are being added to the big existing Soviet submarine fleet numbering above 200."

I'll say it numbers above 200.

If we are going to give out the pro side through classified information, first, why are we heavily cutting the money being put into our own submarine production in this budget and, second, why don't we discuss it on the con side, you might say? In the press today the chairman of the Senate Armed Services Committee, no finer Senator living, said something about the fact the American people have never before heard anything like your testimony, and they now know much more about the world in which they live. I haven't the exact quote here.

Secretary LAIRD. Senator, could I comment on the Polaris question that you raise?

Senator SYMINGTON. Could I finish my comments and then listen to you?

In both papers I read this morning where it said you were releasing previously classified information to present your position. I say with great respect, if we are going to release classified information on the pro side which has shocked the country, intimating that in the not too distant future the Polaris will be in trouble, inasmuch as I personally believe it to be our greatest strategic weapon, then I think you ought to release classified information on the negative side.

Secretary LAIRD. I will be glad to give you both.

Senator SYMINGTON. It ought to be made public, too.

Secretary LAIRD. But there has been no classified information so far as the submarine threat or the possible development of the Soviets included in either of our presentations, either today or yesterday.

Senator SYMINGTON. Well, in that regard——

Secretary LAIRD. I want to make it very clear, Senator Symington, and this is most important, that the Polaris submarine weapon system is an outstanding system, as I said yesterday. I was the sponsor of the amendments in the House of Representatives that gave a go-ahead to this particular program when there were people in the research and development positions that Dr. Foster presently occupies, who were advising us and other Members of Congress not to go forward. They were telling us that the time had not come, it wouldn't work. I went ahead with the amendments and sponsored them in the Appro-

priations Subcommittee that pushed forward the Polaris system and made it possible to have Polaris submarines on station at a very early date.

And this was done at the urging of Admiral Rickover and Admiral Rayborn and others who have been friends and have been counselors and advisers to me over the years.

Yesterday I was asked the question by you whether in the time period of 1972 and beyond we could rely upon the Polaris fleet of 41 submarines as the deterrent force for this country.

DETERRENT CAPABILITY OF POLARIS

Senator SYMINGTON. I did not say the sole deterrent force.

Secretary LAIRD. Well, in your group of questions, and it was limited to the deterrent capability of the Polaris.

And my answer to that was, "No," I do not believe that we will be in a position where the Polaris would be sufficient in that time period, after 1972, to be relied upon as the deterrent force of the United States.

I believe we have to have a more varied deterrent than that one system, and I believe this because of certain sophisticated new research and development programs that are being carried forward, because of the developments not only that we have had, as far as submarines are concerned, but the developments that the Soviets have had in the area of submarines.

So, in directing my attention as to whether the Polaris fleet, if all our bombers and all of our Minutemen were destroyed, would be a sufficient and credible deterrent in the period 1972 and beyond, I tried to give the impression to you, Senator Symington, that I did not think the Polaris fleet of 41 submarines, by itself, would be a sufficient and credible deterrent during that particular time period to prevent a nuclear war.

CONTINUED SOVIET DEPLOYMENT OF SS–9

Senator SYMINGTON. I have found the quote. It was on two different pages: "The American people have never heard anything like this before, the Chairman, Senator Stennis, Democrat of Mississippi, observed after the hearing. The people of America know more tonight about the kind of world we are living in."

Now, in the same article by a reputable and reliable reporter, it says: "In the day-long appearance before the Senate Armed Services Committee, Defense Secretary Melvin Laird issued previously secret intelligence information containing a foreboding picture of the Soviet nuclear threat. It was a picture far grimmer than the assessments of it a few months ago by his predecessor, Clark M. Clifford."

The Washington paper, in an article by an also reliable reporter, said: "The basis that Secretary Laird gave for this assessment is the continued deployment of the SS–9 and ICBM gave for this assessment is the continued deployment of the SS–9 and ICBM with a 20 to 25 megaton warhead much larger than anything the U.S. has on the line. Details about the Soviet SS–9 including its warhead had been classified by the Pentagon until yesterday."

Both of these men are reliable reporters who have covered this field over a period, so I did presume they knew what they were talking about.

EFFECT ON U.S. DETERRENT OF SRAM AND SCAD

The question I asked you yesterday was: With the addition of SRAM [short-range attack missile] and SCAD [supersonic cruise armed decoy] missiles to the already heavy armory of weapons that can be carried by our strategic bombers wouldn't the latter along with the Polaris and Poseidons have the capibility of inflicting unacceptable damage on the Soviet Union during the 1970s without the Minuteman? That was my question.

Secretary LAIRD. Senator Symington, the Polaris by itself, if our Minuteman missiles and our bombers do not survive, will not be enough of a deterrent in the time period of 1972 and beyond. This ABM system tries to protect our deterrent forces by providing survivability for our bombers, early warning for our bombers and protection for our Minuteman. The Polaris, by itself, is enough in the time period of the 1972s and beyond. I would be glad at a later time to get into not only the developments we have had in the SLBM [submarine-launched ballistic missile] area but also the developments the Soviets have had in this area.

MEGATONNAGE OF SOVIET SS–9

Now, with regard to your comments, Senator, on our releasing the intelligence estimate on the megatonnage of the SS–9 warhead, I believe it was necessary to do this in order to have adequate public discussion and to enable the public to understand the megatonnage that is involved with the SS–9 warhead.

Senator SYMINGTON. Very fine.

Secretary LAIRD. And I do not believe that this kind of information is going to hurt us in our relationship with any country in the world. Certainly the Soviets know what they have. I could not see why this should not be made available to the public, and to members of this committee.

RELEASING FIGURES ON U.S. MEGATONNAGE

Senator SYMINGTON. I agree. I am on limited time now and want to get my point across. If you are going to release the SS–9 megatonnage of the Soviets, I think it fair and right that you also say why our comparable missiles do not have that type and character of megatonnage. It could imply that people in the past have been negligent; why we did what we did which resulted in less megatonnage.

Secretary LAIRD. Well, we were and still are going for a second strike capability, as you know. With the large tonnage the Soviets have they are going for our missiles and they are going for a first strike capability. There is no question about that. But Senator, I want to make one comment about my predecessor, Secretary Clark Clifford. You asked why he did not give the same estimate.

Senator SYMINGTON. No, I didn't say that.

Secretary LAIRD. There is no disagreement between Secretary Clark Clifford and myself as to this system.

Senator SYMINGTON. I believe both Secretary Clifford and Secretary McNamara both made decisions as to why it would be better to have greater accuracy and perhaps less megatonnage.

Secretary LAIRD. I didn't want to suggest there is a difference on this between Clark Clifford and myself on what I am proposing because he completely supports my presentation.

Senator SYMINGTON. Mr. Chairman, my time is up. These questions interest me. In addition to all the other problems discussed this morning, based on my own experience, I don't think this system will work effectively enough to put this kind of money into it.

Secretary LAIRD. We would like to show you that it would work and I would like to invite members of this committee to come to the test range at Kwajalein and actually see intercepts taking place. I think it would be very worthwhile. I invited Chairman Fulbright back in January to come out and actually see this system as it works—the Sprint missile, the Spartan missile—I think it would be very worthwhile.

Senator GORE. Senator Javits?

TIMING OF ABM DEPLOYMENT

Senator JAVITS. Mr. Secretary, would you agree that the highest security for the United States is obtainable in effective arms limitation and control?

Secretary LAIRD. I would agree that this is certainly the highest goal of this country and the highest security matter that the administration could undertake. I would like to eliminate as much as possible of my job as Secretary of Defense. I think then we would certainly have a very successful administration. I think we can judge the success or failure of the administration on its ability to restore peace and maintain peace.

Senator JAVITS. Well, I shouldn't say that your job would necessarily have to be eliminated in order to qualify with my definition.

Secretary LAIRD. I really wasn't looking for this job in the first place, Senator Javits.

Senator JAVITS. Now, I notice that you say in your statement: Simply continuing research and deployment on an ABM, without any initial deployment, would leave us with no option to provide defense for our deterrent on the schedule that might be required by the Soviet threat if we do not reach an agreement with the Soviets on limiting strategic forces.

Could you give us any time now, or can you tell us that we must immediately, at least on the most urgent possible basis, deploy this particular system that you recommend?

Secretary LAIRD. Senator Javits, I would like Deputy Secretary Packard to address himself to that point.

Mr. PACKARD. Mr. Chairman, and Senator Javits, when we looked into the system we considered a good many factors and one of the first things we considered was whether the system would, in fact, work, whether the development was far enough along to give us the assurance that we should proceed with the deployment at this time.

As a matter of fact, one of my first conclusions after looking at the information that was available and after looking at the system in some detail, was that it might indeed be a good plan to proceed with what you might call a prototype system. As I saw the system, the components were in good shape, they were able to do the job that was expected of

them. This is a system and I think not only my experience but everyone's experience with these systems indicates that when you get the components together and try to get all of them to work as a system there are a few bugs that need to be straightened out. Therefore I considered the question very carefully as to whether it might be wise to proceed with a prototype system.

After considering the various aspects of this problem, it simply turned out that the delays involved in going ahead with a prototype system and holding up all deployment until a prototype system had been tested would have been rather substantial. The delay would have been 3 or more years, probably even longer than that, if we went to a prototype system.

What our plan involves is a deployment at two Minuteman sites, so that we can put the whole system together, check it out, do the shakedown at the earliest possible date, and then give the President the option of deployment on a much more flexible schedule.

Senator JAVITS. Mr. Secretary, let me interrupt you because we are on very limited time. I don't think that quite answers my question to the Secretary of Defense. Do we have any time, any time whatever, before this decision has to be consummated? Is it 1 month, 6 months? What, in your judgment, is the irreducible minimum of time when you must go forward, in your definition of absolute security?

Secretary LAIRD. Well, I believe that in order to maintain the credibility of our deterrent in the 1973–74 and beyond time period, this system is needed. I think it is most important.

Senator JAVITS. In order to do that we must go forward right here and now. We have no days, months to waste, is that right?

Secretary LAIRD. We cannot delay the decision beyond this budget that we presented to this Congress, covering the program for fiscal year 1970, which begins on July 1, 1969. We must include this deployment on two sites in this particular budget.

VALIDITY OF SAFEGUARD SYSTEM DOUBTED

Senator JAVITS. Now, the other question that interests me greatly is whether this is really a Safeguard system or whether it is an afterthought system. After all, you fellows have been in this job, as it were, for about 2 months, and all that is being done is turning around the same system offered by President Johnson. I think there is a real concern, and I think Senator Symington and others have voiced that concern, that the Defense Department is making an awfully quick shift and that the thing just doesn't have validity.

You argued just as heatedly—maybe you didn't—but the Defense Department people argued just as heatedly, that it is going to give some protection to our cities. Now we throw the city protection out the window and we take the same thing with a few additions and we say now it is going to defend our Minuteman bases. Can you expect the country to simply accept that and say that is so and forget all about what happened before? Therefore, I say, is this a Safeguard system or is it an afterthought system?

Secretary LAIRD. Senator Javits, I want to assure you there are going to be other changes made as far as our Defense Department is con-

cerned. I do not believe that it is necessary for the new administration to be bound by past decisions, whether it is the war in Vietnam or the Safeguard system or the Sentinel system or the bombers or any other weapons system.

I believe that this change is most important. I believe it gives greater protection to our people than the deployment that was approved last year by the Congress. I think people protection is the important thing and the way to protect people is to deter and prevent a nuclear war. We can prevent such a war by maintaining the credibility of our deterrent in the time period after 1973. This is the important point.

Senator JAVITS. May I have one other question, Mr. Chairman?

U.S. REACTION TO SOVIET ABM SYSTEM

One of the things that has been said is that the existence of this system will be more likely to encourage the Russians to negotiate. Perhaps it will, but it will lead us and the Russians to negotiate, in my judgment, on a very much reduced level of possibilties in terms of controlling the arms race. We are already almost putting ourselves beyond the reach of arms limitations. So I ask you this question. Did the deployment by the Russians of their antiballistic missile system around Moscow and Leningrad encourage us to negotiate or didn't it rather encourage us to retaliate, to wit, by building an antiballistic missile system of our own?

Secretary LAIRD. I do not believe it is a retaliation to an ABM system to build an ABM system. The way you retaliate against an ABM system of the kind that the Russians built would be quite different. I don't——

Senator JAVITS. I am speaking of MIRV. We are developing MIRV; aren't we?

Secretary LAIRD. I don't think we really retaliated. Now, as far as MIRV is concerned that is another question. The Soviet Union is moving forward with multiple warheads, and so are we. I do not believe that as long as the Soviets are going forward that we should be in a position where we unilaterally do away with research and development in this important area.

HOW DOES THIS SYSTEM HELP OUR DETERRENT?

Senator CASE. Would the Senator yield? I think that Senator Javits is helping all of us.

The Secretary has, I think, emphasized very strongly that the purpose here is to protect our deterrent, the basic fundamental purpose. The question that I would like to have explored further is why then this system? Why the Spartans? Why get into this light cover business at all? Why not concentrate on the different kinds of——

Secretary LAIRD. We would love to show you this and if I could start on these charts.

Senator CASE. I don't mean to present this now or interrupt the continuity of the presentation, but this is the thing that I think the Senator is questioning.

Secretary LAIRD. This is important. This is very important to our discussion, and chart No. 1 sets this forth. If we could start explaining the system I believe it would be helpful to every member of the committee.

Senator GORE. I am sure it will, Mr. Secretary. What we started out to do was to let each member have one 10-minute period and then come to the presentation phase. Only one member has not yet questioned. We will yield to him if it is agreeable to you and then return at 2:30. We will read your charts to your heart's content.

Secretary LAIRD. The first chart explaining this system is very important, and it answers the two questions very adequately.

Senator GORE. I am very sure it will.

Now, Senator Pell will ask you a question.

Senator PELL. Thank you, Mr. Chairman.

FLEXIBILITY OF NEW ADMINISTRATION REGARDING VIETNAM

While I realize we are not talking about Vietnam. I would like, as one member of this committee, to associate myself with the views Senator Fulbright expressed. Time is moving, and the flexibility the new administration enjoys is gradually being lost as it gets frozen into position and within 10 days at the present rate of fighting we will have more young Americans killed than we did at the time of Korea. I realize this is not pertinent, however, to the ABM and will confine myself for my period of time to questions in connection with that system.

IMPROVEMENT OVER OLD PROPOSED SYSTEM

I compliment you on the improvement over the system proposed by the previous administration, a system which many of us disapproved of and some of us voted against.

I find the question a close one now, much closer than it was, because you have removed the first strike image of the former system. I still lean against your recommendation although I think you have done a good job in improving on what had gone before.

REASON FOR U.S. MIRV DEVELOPMENT

Now, in connection with the system around Moscow, the so-called Galosh, the existence of which we discovered, I think, in the early 1960s, haven't we responded to that with our MIRV program? Wasn't it the Titan MIRV at that time?

Secretary LAIRD. Well, I don't believe that necessarily is the case, Senator Pell. I would like to agree with you but having worked on these programs through the years——

Senator PELL. Much more closely than I have because you were on the Armed Services Committee.

Secretary LAIRD. As much as I would like to agree with you, I can't.

Senator PELL. You feel it is a separate response, a normal outgrowth of regular research and development.

Secretary LAIRD. Yes; it was a separate response and it was something we had under development and under consideration for several years even prior to the time that we knew of the deployment of the Galosh. I would not want to mislead anyone, as much as I would like to agree with you.

Senator PELL. Would it not be fair to say that with the escalation in the balance of terror, whatever you want to call it, in the discovery of Galosh that with the development of MIRV shortly afterward, we now have that degree of sufficiency which we would like to have?

Secretary LAIRD. Well, I think the MIRV is important, and it is important for all of us to know that the Soviets have gone forward with their research and development, and they have even a greater capability for the deliverability of warheads because of the—I am sure this committee has been briefed on this point—because of the size and the thrust of the SS–9.

Senator PELL. But our basic reason for developing MIRV was to increase our own deterrent power, not related, in your view, then to Galosh?

Secretary LAIRD. It was not related to Galosh because we started appropriating funds for the development of this program prior to the time we knew Galosh was in being. That is why I cannot respond that way to that question.

I happen to have been involved in the appropriation process, and we were funding the research and development on the MIRV, and we knew about these possibilities and had funded work on it prior to the time that the Soviet deployment of Galosh around Moscow was discovered.

ORIENTATION OF SOVIET GALOSH SYSTEM

Senator PELL. Incidentally, in connection with the Galosh system, and this, I think, would be of interest to the people in this room, and people who are watching this morning's proceedings, is this system deployed predominantly against the United States, or is it evenly deployed against both the United States and China?

Secretary LAIRD. Well, there is some evidence that some of the radars may be sited for a capability to detect a launch from China. We know that they have the capability to detect any kind of a launch from the United States and there is some evidence that the radars have been turned and are developing that capability.

I would not want to say definitely that that capability had been acquired as of today, but I believe they will have it. At the present time, however, the missiles themselves, I believe, are still targeted against a possible U.S. launch.

Senator PELL. But, in view of the present state of the world, should not the Soviets be far more concerned about a possible Chinese strike than should we be concerned about a Chinese strike?

Secretary LAIRD. Well, we have some information that they are developing detection and surveillance systems that are directed towards China. I would rather not get into that at this time. I do not think any useful purpose would be served from that type of discussion right now, Senator Pell, but I will be glad to discuss it with you separately or with your committee at a later time.

UNDERGROUND TESTING FOR SAFEGUARD

Senator PELL. Yesterday in the Armed Services Committee it was stated that the ABM system would be developed with underground testing. Would not this mean that we must have underground testing in order to move ahead with Safeguard?

Secretary LAIRD. We have not had the development that the Soviets have had in this particular field, as you know. We have had development of warheads that are similar to this at a lower megatonnage tested underground. But I would like Dr. Foster to direct his attention to that particular question because it is a technical question.

Senator PELL. Thank you.

Dr. Foster?

Dr. FOSTER. Senator Pell, we have, as you know, a vigorous underground nuclear test program, and to obtain the warheads that are specified for the Sentinel, Spartan, and Sprint missiles will require a continuation of the current underground program.

Senator PELL. Will this not mean then that if we move ahead with the program as proposed, we will have to give up hope of a complete test ban treaty?

Secretary LAIRD. No, I do not think so, Senator Pell. It depends on what time period you are talking about.

Now, with regard to a complete test ban treaty, Secretary of State Rogers and Ambassador Smith, who is working on that now in Geneva, are maintaining the position that this country has always had in regard to the complete test ban treaty. I would hope that we could move forward with that treaty with proper inspection. Our national position is very clear, but it does not look like this will take place in this particular time period. The Soviet Union has opposed this type of treaty in the past, and they continue to oppose this type of treaty now. So I think within the time period there is certainly the possibility of completing our tests. We have completed them at lower megatonnage, and we are confident that the warheads will work, but in order to satisfy some doubting critics——

Senator PELL. Quite a few of them on this side of the table.

Secretary LAIRD. Some feel that we should have an actual underground test of the warhead, and this will go forward so that there can be no question in the mind of anyone. I am sure that it will work based on the best scientific advice that I have been able to get. I have gone to the best nuclear scientists in the country on this to try to find out, and they all have a great degree of confidence in this particular warhead.

Senator PELL. Right. I thank you on that.

TIMING OF DEPLOYMENT AND ARMS NEGOTIATIONS

Now, would you give us some idea very briefly about the time span in which you are talking—a year, 6 months, 2 years—Dr. Foster?

Dr. FOSTER. Senator Pell, the warhead program is phased to the deployment of the whole system. We are in the process of tests on the basic design of the nuclear components. Later we will be making tests on the fully engineered design.

Senator PELL. I wonder if you can give me your maximum overall time span that you would require.

Dr. FOSTER. I believe that it will require until 1973, when the system first reaches the phases of deployment, before the warhead program will have reached a satisfactory state.

Senator PELL. Right. If that is the case, and the Soviets go along with the idea, if we press them for a complete test ban treaty before 1973, which is 4 years away, we will be unable to accept our own past proposals, and I think this is one more argument against moving ahead with this proposal.

Secretary LAIRD. I would just like to state, Senator Pell, I wish I had the degree of optimism that you possess as far as that treaty is concerned. But my concern is the maintenance of our deterrent during the period from 1973, 1974, 1975 through the decade of the 1970s. This system is aimed at protecting our deterrent so that we can protect our people, maintain peace and prevent nuclear war.

I am not sure that we will have the treaty in the time frame which you are talking about.

Senator PELL. I am not confident either. I am just saying we cannot go along with this system and agree to a complete test ban treaty at the same time within 4 years.

Secretary LAIRD. The argument could be made, Senator Pell, that we should not go along with any weapons system because we are going to have an arms limitation agreement. I hope we have an arms limitation agreement. I hope that it can be worked out. This is a very high priority item. But I cannot assure you, Senator Pell, or any other Senator or any person, that that agreement will be a reality in the very near future.

Senator PELL. I have not said it will be a reality. I said it is the hope of many men, many women, around the world that it is, and if it is we will be caught short because we are going ahead with the program. My time is up.

Senator GORE. Does any member have any further statements?

SOVIET FIRST STRIKE CAPABILITY

Senator FULBRIGHT. Mr. Chairman, I have just one question. Just a moment ago the Secretary made a very flat statement. I believe this is correct, Mr. Secretary. You said "the Soviets are going for a first strike capability, there can be no doubt about that."

Do you have any new or special information about that?

Secretary LAIRD. Senator, I would just like to say that as I look over the development and the current deployment of the SS-9, it leads me to the conclusion that with their big warhead and the testing that is going forward in the Soviet Union, that this weapon can only be aimed at the destruction of our retaliatory force. This is why I think this system is so important.

If they were going to go just at our cities and not try to knock out our retaliatory capability, Senator Fulbright, they would not require weapons which have such large megatonnage.

Senator FULBRIGHT. But, Mr. Secretary, is it not a fact that both countries—the United States and Russia—have always had to postulate their defenses on a possible first strike by the other, and this seems, when you look at it, a very startling statement, but the Russians have

to base their program on exactly the same assumption. They cannot assume all these nice things you say about our being peace loving. They have to assume everyone is engaged in a first-strike capability. That is perfectly natural and inevitable, it is not? They say the same thing about us.

Secretary LAIRD. Well, Senator, I believe that going forward with a defensive weapons systems gives an entirely different image as far as the Soviets are concerned and as far as the world is concerned.

Senator FULBRIGHT. Of course, I do not think they are really very bothered about the ABM either, because I am sure they know, as nearly every witness outside of the Pentagon knows, it is not much good. [Applause.]

TESTIMONY FROM INDEPENDENT WITNESSES

We have had a number of scientific witnesses who have said——

Secretary LAIRD. I hope you will listen to the other scientific witnesses, too.

Senator FULBRIGHT. I know the Pentagon.

Secretary LAIRD. Not from the Pentagon but outside of the Pentagon.

Senator FULBRIGHT. Are there any outside scientists that are not either in the contracting business, working for your contractors or in your employ? What independent scientists are there? I would like you to name them.

Secretary LAIRD. I will be glad to supply you with a list.

Senator FULBRIGHT. This committee would like the names of them.

Secretary LAIRD. I hope you will call them and have them testify. The list will be delivered to you at 1:15 this afternoon.

Senator FULBRIGHT. We want to hear from the independent scientists who are not either working for a contractor or have just recently left the Pentagon and are working for contractors. We have had some of the most eminent scientists, ones who were advisers to President Eisenhower, who were called at the time of the test ban treaty. You know their names. I do not wish to recall them all. None of them felt that the ABM system, as originally proposed, was workable. When I asked Senator Russell last fall, last year, did he have any independent scientists testify on the ABM before the committee, he said, "No." They were all employees of or persons closely related to the Pentagon.

Secretary LAIRD. Senator Fulbright, I remember very well an exchange I had not too many years ago with one of the witnesses who appeared before this committee, Dr. Herb York. I have had great respect for him and he is a close personal friend of mine. At that time I was sitting on your side of the table and I argued with him about increased funding for the Polaris program. He wanted to hold it back because he was not quite sure that it would work.

Now, if we had followed that kind of advice at that time, we could have made a mistake. I am not quarreling with Dr. York, for whom I have great respect and admiration. He sat here as Director of Research and Development for the Department of Defense. But my only point is I hope that you will hear from some of the other witnesses.

Senator GORE. The Chair does not like to cut off the Chairman of the full committee and the Secretary of Defense but I am hungry.

Senator Symington has a brief interjection.

FIRING MINUTEMAN IN RETALIATION

Senator SYMINGTON. Mr. Secretary, when I left the room some of the reporters felt my question was whether the Minuteman would or would not hit the incoming missile. That wasn't it at all. The question was, couldn't we let the Minuteman go to its previously assigned target—hit that target in retaliation. In that way we would have one nuclear missile in our empty silo, and one of our missiles on their country, instead of two—with the Sprint possibly three—nuclear explosions on our country?

Senator GORE. Mr. Secretary, would you like to give your answer at the beginning of 2:30, to answer that?

Secretary LAIRD. I get the message.

Senator GORE. All right, 2:30.

(Whereupon, at 12:45 p.m., the subcommittee recessed, to reconvene at 2:30 p.m., the same day.)

AFTERNOON SESSION

Senator GORE. The committee will come to order.

Secretary Laird, at the time we adjourned for lunch, Senator Symington had just posed a question. For the benefit of those guests in the chamber who may not have heard the question and those on television who may not have heard it, Senator Symington, would you restate the question?

STATEMENT OF HON. MELVIN R. LAIRD, ACCOMPANIED BY DAVID PACKARD, JOHN S. FOSTER, JR., AND GEN. EARLE G. WHEELER—Resumed

Secretary LAIRD. Mr. Chairman, I wondered if first I could, for the benefit of the record, read the names of several of the scientific witnesses that I delivered to you at 1:15 today in accordance with the understanding we had.

Senator GORE. Yes.

LIST OF SCIENTIFIC WITNESSES

Secretary LAIRD. We had just a short period of time, but I would like to list several of the scientific witnesses for the benefit of the record. I hope you will call them and consider listening to their testimony before any decision is made by any individual on this committee as to the credibility of this system and as to the workability of the system.

Senator GORE. Thank you. The committee will be pleased to have the list.

Secretary LAIRD. Dr. Detlev Bronk, professor emeritus and president emeritus of Rockefeller University, New York, N.Y.; Dr. Lee A. DuBridge, the immediate past president of California Institute of Technology, now in the Office of Science and Technology, the White House, Washington, D.C.; Dr. Gordon MacDonald, vice chancellor for research and graduate affairs at the University of California, Santa Barbara, Calif.; Dr. William G. McMillan, senior physicist, professor, UCLA, Los Angeles, Calif.; Dr. Frederick Seitz, president, National Academy of Sciences, Washington, D.C.; Dr. Edward Teller, physicist, Lawrence Radiation Laboratory, University of California, Livermore, Calif.; Dr. Eugene P. Wigner, professor, Princeton University, Princeton, N.J.; Dr. John Wheeler, professor, Princeton University, Princeton, N.J.

Mr. Chairman, this is the list which I delivered to you at 1:15 in response to one of the last questions that you asked me in the morning session.

SELECTION OF THREE TO TESTIFY

Senator GORE. Thank you for the list. The committee is anxious to have as much information, as much public knowledge as possible on the subject, and if you would be so kind as to—not just for the moment—but at your convenience, suggest three from the list whom you think would be particularly fruitful for the committee to interview, I shall be glad to invite them.

Secretary LAIRD. I would rather have you make the choice, but if it is up to me, I will of course follow your instructions, but I think in order to be completely objective, it would be best if you made the selections.

Senator FULBRIGHT. Mr. Chairman, may I ask a question?

Senator GORE. Senator Fulbright.

Senator FULBRIGHT. You will recall that I brought this matter up.

Senator GORE. It was Senator Fulbright who brought this up.

Secretary LAIRD. Mr. Chairman, I understand it was Senator Fulbright.

Senator FULBRIGHT. I think I asked for scientists who were in no way connected with the Government or the administration, either with the Pentagon or the White House or so on. I think some of the people you have suggested have rather intimate connections.

Secretary LAIRD. One of them does, that is Dr. Lee DuBridge, who is now the President's Science Adviser in the White House. He has been there for 8 weeks. But as far as the list is concerned, I believe that the Senator will have no difficulty in selecting three that have absolutely no connection with this administration.

Senator FULBRIGHT. Do you consider Dr. Teller as not identified with the Pentagon in a very intimate way? He has been for many years?

Secretary LAIRD. I would certainly suggest that he is not presently a part of this administration, Senator Fulbright. If you want to cross him from the list, you certainly can. But I would like you to make the selection of the three for your committee. I will be glad to make that selection, but I would suggest that from these names you can find the——

Senator FULBRIGHT. I have no objection to making this selection, if the Chairman does not mind.

Senator GORE. I will be happy to invite the three, either of you select.

Secretary LAIRD. Perhaps Senator Fulbright and I can get together——

Senator GORE. On that point, I am glad.

Secretary LAIRD (continuing). And work this thing out. [Laughter.]

INTEGRITY OF SCIENTISTS NOT QUESTIONED

Senator FULBRIGHT. I certainly do not in any way wish to raise any question about the integrity of these scientists. It is a matter of human nature. If one has spent one's life in a certain activity or if one is working for General Electric or Western Electric—particularly I think it is Western Electric in this case which is the major contractor—it would be rather foolish if he did not have a bias in favor of ABM just as I have a bias in favor of cotton and poultry. This is a fact of

life—[laughter]—and I do not get offended if you think I am not objective about poultry. Of course I am not, and the same thing holds for the ABM.

Secretary LAIRD. I used to feel the same way about milk, and I still do.

Senator FULBRIGHT. I am sure you do. [Laughter.] I do not want anybody to think I raised a question about Dr. Teller's integrity or honesty. This has been his profession. He was the most vigorous opponent of the test ban treaty. If I remember correctly, he did not approve of making the slightest concession in any way——

Secretary LAIRD. Why do we not cross his name off the list. I am sure you can still find three on that list. There is no one that is employed by the Bell Laboratories, the concern which you mention.

Senator FULBRIGHT. I did not mention Bell Laboratories. I mentioned these scientists who came here last week. I did not select them, the Chairman did. You know who they are, mostly from the major educational institutions. These institutions are subsidized to a great extent by the Pentagon, and yet they have as high a degree of independence from the military establishment as one can have in this over-militarized society.

Secretary LAIRD. Senator Fulbright, I am sure that you can find three from this list——

Senator FULBRIGHT. I am sure, too.

Secretary LAIRD (continuing). Who are completely objective.

Senator FULBRIGHT. I did not want anybody to think I was raising a question about Dr. Teller's character or that of any of the others. That is all I am trying to say.

Secretary LAIRD. Well, I was asked in a short period of time to put together a list. I have on the list the president of the National Academy of Sciences. I have others listed who are in that group, and I think that the three that the Chairman I understand will hear——

Senator FULBRIGHT. It will be very interesting.

Secretary LAIRD (continuing). Can very easily be picked from this list I have submitted.

MOST COMPETENT JUDGMENT SOUGHT

Senator CASE. Mr. Chairman, may I just make a comment here? I do not think we can find people who are sufficiently removed from experience as to be absolutely neutral in a matter of this kind, and I do not think we should necessarily look for that. What we want is the highest competence, judgment as to the facts we can get.

Secretary LAIRD. That is what I thought you wanted, Senator Case.

Senator CASE. As to the capability of the technology, as to the prospect of the future in this esoteric business—and I am sure between our own resources and the advice that the Secretary has given us, we ought to be able to pick people here and make our own judgment about discounting what they may say for one natural bias or another.

Senator GORE. The subcommittee thanks you, and we shall invite three of these gentlemen.

Senator Symington, will you restate your question?

Senator SYMINGTON. Thank you, Mr. Chairman.

FIRING MINUTEMAN AS A SECOND STRIKE

My question, Mr. Secretary, inasmuch as you say there is a point of no return in increasing the PSI of the Minuteman, and inasmuch as the PAR has a long range radar capacity, why would it not be possible,

when a missile attack, a preemptive strike, was recorded, for the Minuteman to be launched to the targets to which it was planned they would go?

In other words, with the time involved, and the relative short action of the solid fuel Minuteman, why could we not get it off and hit in a second strike instead of just letting it sit and wait to be hit?

Dr. Foster, does that present——

Secretary LAIRD. I think that question does clear up the little misunderstanding that we had in regard to the Minuteman. I would just like to say, Senator Symington, that that kind of a decision could be made, but I am not sure in my own mind whether the President on that kind of information would unload all of our silos. I think that this is a very difficult decision to make on that kind of information, but I would like Dr. Foster to comment on that from a technical standpoint.

Senator SYMINGTON. May I say that if it were an accidental launch we were talking about, presumably a Sprint could certainly handle such a launch. If it could not, then the Sprint could not handle anything.

Secretary LAIRD. But that is assuming that we have this system.

Senator SYMINGTON. I understand.

COMMAND DECISION

Second, yesterday when I inquired about problems incident to a close launching—for example, a submarine that has slipped by sonar—where would the President come in? I think you said you would rather talk about that in executive session.

Secretary LAIRD. Well, this whole command problem, Senator, the exercise of that command on the information which you use as the premise of your question, you would assume that the President would immediately react. Now, I think that this is an assumption that we have to be very careful with, because I believe that our country has always taken the position that we wanted to maintain a second strike capability and that we wanted to maintain that credibility of our deterrent. This is the way we protect people and this is the way we prevent nuclear war. This is most important.

But this command decision which you talk about could be made. I am not sure it would be made that rapidly, but I would like Dr. Foster to comment.

Senator SYMINGTON. I do not want to labor it. But if what you say about PSI is correct, and about the capacity of the new SS–9, then you are going to have your second strike capacity destroyed.

Secretary LAIRD. I would like to be able to protect our deterrent force with the ABM system that we contemplate rather than have to unload all of our missile silos as you suggest. I would like to have Dr. Foster talk to that point.

Dr. FOSTER. Senator Symington, the Minuteman weapons system is so configured today that if we had warning of a Soviet attack either by BMEWS or by the over-the-horizon radar, we could certainly, if the President ordered, launch the force in a very short time. There is no technical limitation to the proposal that you are making. The limitation is only one of retargeting our deterrent to his attack. We would have the flexibility that the United States would then have to retaliate on his cities for an attack on U.S. missiles.

Secretary LAIRD. There would be a very difficult——

CAPABILITY OF SOVIET SS–9

Senator SYMINGTON. Again, I do not want to labor it. You and I have talked about this many times. Only a few months ago we were told by Dr. Enthoven that the SS–9 had been built for a second strike capability. It seems for various reasons, we do not want to establish what could be the greatest deterrence of all. If the Soviets knew that, if they went after our missile bases, we in turn would go after their cities, that would be a far greater deterrence than anything brought up in these meetings to date.

Secretary LAIRD. Well, it certainly can be done, Senator, and I do not want to raise any question about that. But, one of the reasons that we have gone along and we have joined together on maintaining a bomber force has been the recall capability which we do possess with our bomber force. This is a very important factor which we have, and this is one of the things that we would like to protect. This is one of the things that this system helps us to protect to some degree. I think this callback capability is most important. I would like to see that degree of flexibility for the President of the United States maintained.

Senator SYMINGTON. But if you launch them without arming them and arm them in the air, is that not about right?

Secretary LAIRD. Do you want to comment on that, Dr. Foster?

Dr. FOSTER. I am a little concerned, Senator——

CONTROL OVER MISSILE

Senator SYMINGTON. In other words, you have positive control over the missile just as you have over the bomber?

Dr. FOSTER. Senator, I am a little concerned over that proposal. [The following sentence was later added by the Defense Department: "The current Minuteman does not possess such a capability."] I would much rather have a capability to ride out the worst attack the enemy could deliver and have the assurance in his mind that he would not accept the consequences of retaliation.

Senator SYMINGTON. So would I, but it does not change the thrust of the thought.

Secretary LAIRD. But you know what we are talking about, Senator. I am sure you understand.

Senator SYMINGTON. And you know what I am talking about, Mr. Secretary. [Laughter.]

Secretary LAIRD. I know what you are talking about. You are talking about a full strike immediately, and certainly we do not want to discount that from our deterrent force. I am not raising any questions about it.

Senator SYMINGTON. All I am saying is that, under modern technology you have the same amount of control as to launch on the missile sites as you did in the past.

Secretary LAIRD. But we do not have the time factor.

Senator SYMINGTON. That is right. It is down to minutes however, instead of hours.

Secretary LAIRD. And we are down to a very few minutes. I think that should be understood by all of us.

Senator SYMINGTON. Thank you, Mr. Chairman.

Secretary LAIRD. You cannot bring our missile force back and refuel it. You can bring——

Senator SYMINGTON. But at least you would have it unarmed, ending up without a nuclear explosion.

Secretary LAIRD. You can have it land without a nuclear explosion, I know that, but it is a question of minutes, not hours. [Subsequently, the Defense Department amended this answer to read as follows: "No. Once the Minuteman is launched no control over the arming process is possible."]

PROTECTION AFFORDED BY PHASE I OF ABM SYSTEM

Senator GORE. Mr. Secretary, this goes to the very first question I posed to you, to which I have not yet had an answer.

You will recall that I attempted to join issue with your view that the deployment of the ABM is necessary to preserve the integrity or credibility of our deterrents. It is necessary to talk about some numbers, percentages, and probabilities.

Senator Symington has just explored with you one phase of that problem, which is the greater deterrent, the notion that we might defend our missile sites with ABMs or in case those missile sites are attacked, that the missiles will be unloosed.

Another part of this is what percentage do you propose of our deterrent missiles, deterrent weapons, will be protected by phase I of the ABM system that you recommend, if it works perfectly?

Secretary LAIRD. I tried to answer that question this morning, about 30 percent will be covered with a thick cover in the phase I deployment. Now a much larger percentage will have a thin cover. But your question is directed to the degree we can positively protect, and we are in the area there of only 30 percent, approximately.

Senator GORE. That is 30 percent of the Minutemen?

Secretary LAIRD. Yes.

Senator GORE. Then what percentage of the total nuclear missiles which are capable of being fired upon by the Soviet Union would 30 percent of the Minutemen represent?

Secretary LAIRD. Thirty percent of the Minuteman, and this gets into the very classified area of, as you know, Senator, of how many missiles we have——

Senator GORE. Well, you have 656.

Secretary LAIRD. Targeted.

Senator GORE. We have approximately 656 Polaris missiles.

Secretary LAIRD. But this gets into a very classified area of how many Polaris are on station, and the number of Polaris on station isn't 41, as you know.

Senator GORE. I know.

Secretary LAIRD. I do not believe that in open testimony I should reveal the number of Polaris that we can keep on station at any one time. I have been very careful about that. I know how many were on station yesterday, I know how many were on station last Wednesday. I believe that if you want to know how many were on station yesterday, that this is not a question that I should answer now.

I can tell you as of 2 months ago how many were on station. I don't think we would be in too much of a problem on breaking security. But you understand what I am talking about.

When you get into these percentages, I would rather use a date back maybe 6 months ago or a year ago.

The same thing is true as far as our alert B–52s are concerned. I would rather not talk about the number on alert today in answer to your question. I would rather talk about the number on alert 6 months ago or a year ago, and I don't believe I would be breaking any classification.

Senator GORE. You and I understand what we are talking about.

Secretary LAIRD. But you were putting in all of the Polaris in your figures this morning, and it is just not possible for us to put all the Polaris submarines on station at one time.

Senator GORE. Let us take one-half of them. That nowhere approximates, and I don't intend for it to approximate, the amount of Polaris missiles that are on station at any one time. It is entirely a hypothetical figure.

Secretary LAIRD. Fine.

PERCENTAGE OF DETERRENT POWER PROTECTED

Senator GORE. But assume that instead of 656 there are in fact 328 on station, purely a hypothetical assumption, and then suppose that we have 646 intercontinental bombers, and then add to that the missiles in Europe. So, you see, you propose to protect by your ABM deployment around two missile sites in Montana and North Dakota less than 10 percent of the deterrent striking power of the United States.

Secretary LAIRD. I think that is pretty important if you are in a position where your missiles have been wiped out or where your bomber force has been hit in a surprise attack.

Now, this is most important, Senator.

I have great confidence in the Polaris that are deployed at the present time, and I am sure that as of today that they would survive and would be capable of being targeted as a deterrent force.

Now, it is most important on how you have to target those. Because there is an ABM force around Moscow, we would have to target at least two missiles on each of those ABMs.

We have to assume, whether you would like to or not, that those particular ABMs around Moscow have the capability of knocking down a missile.

Senator GORE. If they had one more than they knocked down there wouldn't be anything left of Moscow.

Secretary LAIRD. Well, I wish I had that confidence. This gets into the question of warhead size and the location of the ABM missiles themselves, Senator. You have greater confidence than I do in being able to knock those out with one missile. You have to be able to be in a position where you can get part of your missile force through. So your first missiles have to be targeted against the ABMs.

Senator GORE. I personally witnessed a nuclear explosion and I have a very great deal of respect for them.

Secretary LAIRD. Well, I have great respect for them, too. But I am sure that you understand the kind of difficulty we have as far as the targeting is concerned. This is a very delicate area that we are in right now, Senator Gore. But, the important thing that I would like to come through in this hearing is that what we are trying to do is to prevent nuclear war. We are trying to maintain the credibility of our deterrent in the time period of 1973 and beyond. We believe we can protect our people by maintaining the credibility of our deterrent, and this is most important, Senator Gore.

PROTECTION OF BOMBER FORCE

Senator GORE. I am reading here from the 1970 defense budget, a public document; there are no classified figures. I find on page 42, ICBM launchers, 1,054; SLBM launchers, 656.

Secretary LAIRD. That is correct.

Senator GORE. Intercontinental bombers, 646. Total force loadings, approximate number of warheads, 4,200, and you are proposing to protect 330.

Secretary LAIRD. Senator, you are trying to limit this just to the Minuteman. The question you asked me had to do with the Minuteman force that would be protected in those two missile fields, and I said 30 percent of the Minuteman force. You didn't ask me about the bombers. I would be glad to discuss the bombers, too.

First, the PAR radars would give us an acquisition at a much earlier time, and this will have a tremendous effect as far as protecting our bomber force is concerned. And the bomber force is given protection by the deployment and operation of these two PAR radars. When you start cranking in the 646 bombers, I want to assure you that this ABM system has a very effective protective cover for that bomber force, as far as warning time is concerned. It would be indeed helpful to us, along with the other systems that have been developed through the years, to have this kind of protection. And the Sprint and the Spartan missiles will give us additional protection for these bombers.

But my answer, Senator, and I want to be very clear about this, had to do with the protection I thought the two ABM sites in the missile fields would provide.

PROTECTION BY MODIFIED SYSTEM UNCONVINCING

Senator GORE. That was my question.

Now, these statistics which I have read from the budget presentation do not take into consideration the multiplication of the number of warheads which is scheduled through our MIRV program, through the replacement of the Polaris missiles with Poseidon missiles. A Poseidon missile, as you know, has a capability of 10 warheads whereas the Polaris has one.

Secretary LAIRD. Senator, that is not quite an accurate statement and it is a classified matter as far as the warheads are concerned.

Senator GORE. Well, some of them may be nine instead of 10, some of them may be 12 instead of 10, depending upon the configurations, but generally speaking the rule of thumb is a factor of 10.

I won't argue with you.

Secretary LAIRD. Not far off, but the problem involved here is the difference in the size, and the size does not go down in the same ratio as the——

Senator GORE. I agree, but I assure you I was not trying to take an arbitrary and an unfair factor. I think 10—make it nine, make it eight, it still comes out that what you propose to protect by phase I is even less than 3 percent of the missiles which are capable or will be soon capable of firing upon the Soviet Union and what you say is necessary to preserve the integrity of our deterrence. I just say that it is not a good case, it is not a convincing case.

Secretary LAIRD. Mr. Chairman, I would just like to say that you, of course, have to consider the whole system when you look at this problem. This system is a phased system and when, in the first place we can protect 30 percent of our Minutemen, plus provide additional protection for our bomber force, I would certainly urge you to consider this as an asset in protecting the credibility of our deterrent.

I would like Dr. Foster——

PROTECTION OF 3 PERCENT OF DETERRENTS UNACCEPTABLE

Senator GORE. I would be willing to give it consideration but I am not willing to accept your conclusion that our vital security depends on protecting less than 3 percent of our deterrents on the basis of preserving the integrity of our deterrents. This is not a reasonable——

Secretary LAIRD. It is 30 percent of our Minutemen and very important protection for our whole bomber force.

Senator GORE. But not at all important to the Polaris?

Secretary LAIRD. And it gives a thin cover over 90 percent of our Minuteman silos. This is important to bear this in mind, too, Senator.

Senator GORE. Well, now, this brings up the question that you had with Senator Symington.

I don't claim to be a technician in this field, but I really can't understand, I can't rationalize how a President of the United States, if he were in position to exercise the command function, or how a commander on the spot, would decide to push the ABM button instead of the Minuteman button if nuclear missiles from Russia started falling.

Secretary LAIRD. After impact, Mr. Chairman, I think you are quite right.

I think if we could give this presentation on how the system works this point would be understood more fully not only by the members of the committee but by the public which is also interested in this discussion.

Senator GORE. Well, we are very anxious to have that but there are a few things we want to understand prior to that.

COMMAND DECISION AT A MINUTEMAN SITE

For instance, now, let's take a hypothetical case, a sergeant or a lieutenant or a Secretary of Defense, or whoever is out in Montana at the missile site, who finally gets the President of the United States on the telephone, and in an excited voice says, "Mr. President, the radars, 4½ minutes ago, picked up three ICBMs coming over the horizon from the Soviet Union, they are in trajectory bringing them on top of us, which button do I push?" The President asks some questions, and he said, "Mr. President, I see three more. We have got 3 minutes left." "Well, do you see any more?" "Yes, Mr. President, there are three more and they are headed for North Dakota; which button do I press?"

Senator FULBRIGHT. The panic button. [Laughter.]

Secretary LAIRD. Mr. Chairman, could I respond to this deadly serious question? This is a deadly serious question that you are asking.

Senator GORE. Of course, it is a serious question.

Secretary LAIRD. It is not any laughing matter. It is a deadly serious question, and it gets right down to the heart of the discussion here today. I can tell you that if I were sitting in the position of the President of the United States, I would like to be able to have an ABM to launch and not have to push the button for the strike. I would like to have that capability of being able to intercept some incoming nuclear warheads. I think that this is most important, and it would be to you if you were sitting in that position, Mr. Chairman. I think that you would like to have that feeling that you could make an intercept and that you could protect your retaliatory force.

But it is even more important that the potential enemy knew that even after absorbing that strike we would have sufficient capability left, in the period of 1975 and beyond, to destroy him in retaliation.

We have to talk about that period now because this is applicable to that period—not today, not tomorrow, not next year. The possession of a credible deterrent is what is going to enable us to avoid nuclear war.

Mr. Chairman, I hope the money on this system is wasted. That may seem to be a very unusual statement for me to make, but I have served on a committee which has appropriated billions of dollars to these various defense systems since 1952. When people tell me that we have wasted money with these various systems, I say that we have been successful with these systems because we have kept this world from getting into a nuclear war. We haven't had to use these weapons, and I hope we never have to use them. What we have to do until we can get some sort of a meaningful arms control agreement, as far as offensive and defensive weapons are concerned, is to maintain this kind of credible deterrent so that we can prevent nuclear war. That is what I am interested in doing. I would like to be in a position where the Secretary of Defense can truly be a secretary of peace, and I think you can be a secretary of peace if you avoid war by maintaining the credibility of this deterrent.

SAFEGUARD AS PROTECTION OF OUR DETERRENCE DOUBTED

Senator GORE. Well now, Mr. Secretary, you have now advanced once again the assumption that the Soviet Union might launch nuclear attack, so to speak. That the missiles coming over the horizon, which the man in Montana saw or might see, would be the limit. I just can't accept your hypothesis.

Secretary LAIRD. I was using your figures as far as the missiles were concerned.

Senator GORE. May I proceed for just a moment?

I cannot find practical your hypothesis, that under any set of circumstances imaginable to me, that the Soviet Union would launch a limited nuclear attack upon the United States. Coming back to Senator Symington's point, although I think it may be a gruesome one, and one we don't like to contemplate, but if you want to give credibility to your deterrents, let the enemy know that if they launch a nuclear attack upon us that we are not pushing an ABM button, we are making a massive retaliation. This is the real deterrence that we have. We have in a short time with the development of the MIRV and the multiple warhead on the Poseidon missile more than 10,000 nuclear weapons that can be rained upon Russia. Yet you say that it is necessary to deploy this ABM system around two missile sites in Montana and North Dakota to preserve the integrity of our deterrents. I think it is a weak case.

Secretary LAIRD. Mr. Chairman, I just want to say to you, that you put a great premium on surprise. I am confident and I am not trying in any way to question our present deterrent force and I don't want anyone in this room or in this country or this world, to question it in anyway.

But, putting such a premium on surprise does cause me some concern.

Senator GORE. I will close, unless I trespass upon the time of my colleagues, by saying if you are going to take all precautions against surprise, then you have to leave the computers on, then you have to minimize the command function of the President of the United States. It has to be ready to respond to a given set of circumstances which a programer has put in the computer ahead of time. I would just like to say this: I asked a scientist the other day what would be the chance of an electronic failure, and he said "Well, it might be as impossible

as the Mississippi River flowing uphill or a northeastern power failure." Within the last week the wife of a member of the U.S. Senate received a very generous check from the Social Security Administration. The computer had declared her husband dead and sent her the widows benefit. The Senator returned the check. [Laughter.]

Secretary LAIRD. Do you want me to comment on that? [Laughter.]

Senator GORE. I don't want to see any computerized nuclear war.

Senator CASE. Mr. Chairman.

Senator GORE. Senator Case.

REASONS AGAINST ABM DEPLOYMENT

Senator CASE. Again I will take only a couple of minutes to stress that if this is not necessary we ought not to do it, and I would just like to review again the reasons why we ought not to do it.

In the first place, it is terribly expensive. But far more important is that it will lead to some escalation of the arms race, just as we responded to the Soviet deployment of a now obsolete missile defense around Moscow by stepping up development of MIRV. And as we get into a higher level of armament on both sides, with secrecy and mobility and all the rest of it, we are going to be in a situation in which it will be almost impossible to agree upon arms reduction, because while we are an open society and an arms agreement on our part can be pretty well policed, Russia is not an open society, and commitments on her part cannot be policed in the advanced state of armaments that we are talking about here without on-site inspection. She will never agree to inspection.

So this is a vital matter we are talking about, not just spending billions of dollars, as if that were not important, but the matter of agreement on reduction at a time when agreed arms reduction is a possibility.

So I do again urge that there must be no information that the country can't have here in order to make up its mind just as we have to make up our mind on these questions.

One, will this thing work? Is it necessary? Are there other options that we haven't adequately considered? And what is the doubt as to the effectiveness of our submarine capability with Poseidon coming along after some early time in the 1970s?

We need to have more than just your assurance that in secret session you will give us that.

Secretary LAIRD. I would like to do that right now, Senator.

Senator CASE. Good.

PLACING ALL CREDIBILITY OF DETERRENT IN ONE SYSTEM

Secretary LAIRD. First, let us take the question of Polaris. In answering the question regarding Polaris this morning, Senator, I said I would not want to be in a position after the 1972–73 time period to base all of our deterrent capability on one system—the Polaris submarine system. Right now I am very confident that I think we can rely considerably on that Polaris system. But there are some new developments as far as detection and other things are involved, and in the 72–74 time period I would not want to place all the credibility of our deterrent on that one submarine program with 41 boats and several of them always off station, as you know. That was the point that I tried to make yesterday.

I would like to have the option, which these charts will show, of insuring the survival of at least part of our bomber force and part of our Minuteman force, to give further credibility to our deterrent during that time period. That is why I don't want to put all my eggs or all our country's eggs, in the Polaris basket as far as deterrence is concerned in that particular time period.

Senator CASE. That was the meaning of your words yesterday and again this morning.

Secretary LAIRD. Absolutely, Senator.

Senator CASE. It wasn't some mysterious, occult, arcane thing that you had discovered and the executive branch knew about and the rest of the world didn't.

Secretary LAIRD. No, I think Senator Symington knows well what I am talking about——

Senator CASE. I know, but Senator Symington is an unusual case.

Secretary LAIRD. He asked it yesterday and I think we understood each other when I answered the question.

RELATIVE MILITARY BUDGETS OF U.S. AND U.S.S.R.

Now, the second part of your question had to do with the funding levels and the amount of dollars being spent by our government vis-a-vis the Soviet Union in the field of strategic weapons, both offensive and defensive.

Now, the last budget of the Soviet Union showed clearly that they were outspending us in the area of strategic offensive forces by better than 3 to 2. It showed that in the field of strategic defensive forces they were outspending us on a dollar conversion basis, better than 1 to 3—about 1 to 3.5 or so, depending on how you calculate their space program. If you put in some of their space programs which really have a military aspect, you can go to the higher level. But if you take that space program out, you come down to a minimum of 1 to 3.

Senator CASE. Just for the sake of understanding the meaning of this comparison, it isn't the amount of dollars or dollar equivalent that you are talking about?

Secretary LAIRD. I am talking about dollars.

Senator CASE. It is the amount of hardware that is purchased?

Secretary LAIRD. I am talking here about what their program would cost in dollars.

Senator CASE. As far as the equivalent is concerned?

Secretary LAIRD. Now, I am going to change the comparison and crank in the difference between the gross national product of the United States and the Soviet Union. The gross national product of the Soviet Union is approximately one half the gross national product of the United States. So when we combine the costs of the strategic offensive and defensive weapons systems, and convert that to an effort ratio based upon the gross national product of two countries, we find that their effort ratio is almost four times the effort ratio of the United States in this field.

Now, this is what concerns me. I believe that the Soviet Union is concerned about this, too. I believe that this is one of the reasons why we will be able to move in the direction of strategic arms talks, and perhaps come to some kind of an agreement. The impact of what the Soviet Union is currently doing on its own people, on its own budget, and on its own finances is causing much more difficulty to them than it causes to us, and I think all of our people should understand that.

CREDIBILITY OF OUR DETERRENT QUESTIONED

Senator CHURCH. Mr. Chairman, I have had some difficulty following the Secretary's argument. The whole purpose of this exercise is to avoid a nuclear war, not fight one.

Secretary LAIRD. Absolutely.

Senator CHURCH. And you have said you hoped one day to be secretary of peace and I hope fervently that you one day are. But our massive investment in deterrents is made for the purpose of persuading any other country possessing nuclear weapons, and particularly the Soviet Union, the major threat, that it must never attack the United States, because we will have a deterrent capability to survive that attack and to retaliate in such force as to inflict unacceptable damage on the attacker. Isn't that the whole idea of the deterrent system.

Secretary LAIRD. That is correct, Senator.

Senator CHURCH. Right.

Secretary LAIRD. And that is what we are talking about here today.

Senator CHURCH. But you have emphasized, you come back again and again to the argument, Mr. Secretary, that you are proposing this ABM system in order to give added credibility.

Secretary LAIRD. Added protection to our deterrent.

Senator CHURCH. Added credibility to our deterrent because it adds a measure of protection to it.

Secretary LAIRD. There is nothing offensive about our system at all.

Senator CHURCH. Let's put ourselves in the place of the Russians, and that is why the revelation brought out here by Senator Symington, it seems to me, is so terribly important. If I were in the position of the Russians trying to decide whether or not to use these big ICBMs with their tremendous warheads to make a first strike against the United States, considering the enormous destruction that these warheads would inflict if they penetrated, and I watched the United States build an ABM system around its missile bases, the reliability of which, according to much of our testimony, is at least open to considerable question, I would conclude that the United States was attempting to build a system designed to protect these bases against a first strike. I might have very little confidence, as a Russian, in our defense system, even as we seem now to have very little confidence in theirs.

Secretary LAIRD. I can't have very little confidence in theirs, Senator.

Senator CHURCH. Well, we have heard theirs is relatively obsolescent, but my point is this——

Secretary LAIRD. You assume that is so.

SAFEGUARD SYSTEM DETRACTS FROM OUR DETERRENT CREDIBILITY

Senator CHURCH. But that isn't the point I want to reach, Mr. Secretary. The point I want to reach is this: It seems to me that this system won't necessarily contribute to the strengthening of the credibility of our deterrent, but rather might tend to weaken its credibility for this reason: If the Russians knew that if they ever launched a strike—and I agree it is going to be a massive strike if they ever launch it, not a powder puff affair as someone commented this morning—if I were in the position of the Russians and were going to launch a massive strike, and I knew that the United States stood prepared, upon the first evidence of an incoming strike to loose her Minutemen against the Russian population, reserving, of course, the right to disarm them, if necessary, in the event of a miscalculation; but if I were the Russians

and knew that an immediate counterlaunch of Minutemen would be the American response to any first strike against the United States, I would be far more reluctant to launch the attack than if I thought the United States might rely upon a defensive system in which I, as a Russian, had contempt. In other words, it seems to me that the very defensive system you are talking about might weaken our deterrent credibility, and might even lead the Russians to conclude that they might hazard a first strike. Whereas their certain knowledge that a full-scale retaliation by the Minuteman would occur, upon the first evidence of their incoming attack, would certainly constitute, in my judgment, a far greater deterrent upon them.

That is why I just can't follow your argument that we are strengthening our credibility of the deterrent by deploying an ABM system around certain of our missile bases.

Secretary LAIRD. I would like General Wheeler to comment on that question.

Senator CHURCH. I wish he would.

Secretary LAIRD. Senator Church, the proposal which you make has some very important contingencies involved. I don't want to raise any question about our intentions because this could cast serious doubts on the credibility of our deterrent. I want you to understand and I want all others to understand that this is our intention, and this would be the intention of this country, and this adds to the credibility of our deterrent, but we also have a time problem here and we also are in a position where the President of the United States who makes this decision under the way we operate.

Senator CHURCH. Yes, Mr. Secretary.

Secretary LAIRD. And we have a very important time problem here which I am sure you are familiar with.

Senator CHURCH. Yes.

Secretary LAIRD. But I think General Wheeler should really comment on this, the military aspect of this question.

SAFEGUARD MIGHT HAVE WEAKENING EFFECT ON OUR DETERRENT

Senator CHURCH. I would like him to. May I just say first, General, my point is that there may be a very real danger that the deployment of such a defense system might lead the Russians to conclude that we might try to absorb a first attack. If they were so to conclude, this could have a weakening effect upon our deterrent rather than a strengthening effect.

General WHEELER. Well, I believe, Senator, it has been the announced policy of the United States for a number of years to configure our forces in such a way that we can survive a first strike and retaliate in such a way as to inflict unacceptable damage on the Soviet Union. This, I think, has been said by Presidents, by Secretaries of State, by Secretaries of Defense, and others over the years.

The fact that we have put our Minuteman in hard silos is another proof, it seems to me, that this is our intent. Therefore, I cannot see that adding to the protection of these silos by deploying an ABM should weaken the deterrent. I think, on the contrary, it improves the deterrent aspect of our deployment.

Senator CHURCH. May I just say, Mr. Chairman, although I respect the answer the General has given, I feel it does not remove the question I have raised.

Secretary LAIRD. Senator Church, it has always been our policy to be able to have a credible deterrent to such an extent that we could survive a massive first strike by any nation, and still be able to strike back.

Senator CHURCH. I understand that.

Secretary LAIRD. And the questions that you and Senator Symington are posing are on a somewhat different policy question that we should unload our silos immediately, and not depend on a capability to survive a first strike.

I am sure that in the testimony given by every Secretary of Defense in the last few years, it has always been our hope—and we feel that we are in the position today even if we are surprised—that we could survive a first strike and still deliver enough of a retaliatory blow so that the enemy would not be foolish enough to launch that first strike.

Senator SYMINGTON. Will the Senator yield? To be sure we understand each other, Mr. Secretary. I didn't suggest this as a substitute. So far as the survival of the first strike, if it did go through, it would mean they would be hitting empty silos, but having their cities destroyed as part of the second strike. So I must say——

Secretary LAIRD. I understand.

Senator SYMINGTON. I fully agree with the reasoning of the Senator from Idaho. I think he is right. If I were in the Soviet Union I would think this would show we did not have the credibility confidence then that we have today.

Secretary LAIRD. Well, Senator, I would like to be in a position where we could survive a surprise attack and still deliver a devastating blow. I believe that this adds to the credibility and it puts us in a position where we will not have that nuclear first strike.

I understand what you are talking about as far as the policy is concerned, but we are in a position today where we could survive that first strike and still destroy any possible aggressor. I would like to remain in that position in the event that we have some sort of a surprise attack where we wouldn't have enough time to respond before the enemy's warheads detonated. I think it is important in order to maintain our credibility, that we be in that position in the time period of 1973, 1974, 1975 and the decade of the 1970s. That is what this system which we want to explain to you will do.

CONSTRUCTION OF ABM RAISES RUSSIAN DOUBTS

Senator CHURCH. I just want to say, Mr. Secretary getting back to our point, we are building this system so that we will not have a nuclear war. If there is a first strike on this country, according to the information I have seen—80, 90, 100 million Americans are going to die, and the country is going to be incinderized to the point where there will be little left. Khrushchev himself once admitted——

Secretary LAIRD. We are trying to avoid that.

Senator CHURCH. The survivors would envy the dead.

Secretary LAIRD. We are trying to avoid it. We are agreed on that, Senator.

Senator CHURCH. Yes, we are agreed on that. But the question is how do we best avoid it? Do we strengthen the credibility of our deterrences by suddenly beginning to build a defensive system? I think we

do not. We might even raise questions in the Russian mind that we were trying to build a capacity to absorb such an attack.

Secretary LAIRD. We have the capacity today.

Senator CHURCH. I don't see how you add to your deterrent, Mr. Secretary, by raising any doubts in the Russian mind, even though you don't intend to, but the very construction of a defense system could raise some doubt. The better deterrent is a certain knowledge that a massive attack upon the United States would immediately touch off an utterly devastating retaliation. I just don't see how you strengthen that certain knowledge in the Russian mind by starting to build an ABM system, and nothing you have said today suggests an answer.

SURVIVING A FIRST ATTACK

Secretary LAIRD. Well, Senator Church, the strong thing about our deterrent today—and I am sorry I am not communicating this to you because this is an important point—is that it will survive a surprise first strike of the Soviet Union to such an extent that we can deliver a devastating attack.

Certainly we don't want to absorb that first strike if we don't have to. But it is important that we be in a position so that if we are surprised we have a credible deterrent that will survive. We are dealing here with a very few minutes, Senator. If we are going to prevent nuclear war it is important that the potential attacker realizes beyond any question of a doubt that we will have enough surviving forces in this important time period that we are talking about to deliver a devastating retaliatory attack. This will deter nuclear attack. This will protect our people. This will keep the peace. I think it is most important that we understand one another on this important point. It has been the policy of the United States to have a credible deterrent that can survive a first strike. I hope that you are not suggesting that we do not maintain the credibility of that deterrent.

Senator CHURCH. I am not. Indeed I am saying the opposite—that your ABM system, may not increase the credibility of our deterrent but might actually detract from it.

Secretary LAIRD. No, our hardening program increases it and this ABM program increases it. I think it is important to maintain that position in the decade of the 1970s.

MINUTEMAN CAPABILITY FOR RESPONDING

Senator CHURCH. Mr. Secretary, in response to Senator Symington, as I understood you, you testified that the present Minuteman system had a capability for responding; that is, that we could unload the silos if we had evidence of a full-scale attack against us, before the silos were destroyed, before the attack reached them.

You said we had that capability. It would be a question of whether or not we would want to use it. You said it would be a hard decision to make and there would be a very short time in which to make it.

Secretary LAIRD. I am talking about the possibility of a surprise attack and not getting your missiles launched in time. This is why we have always tried to protect our deterrent to such a point that we do have a surviving second strike capability.

This gives real credibility to our deterrent. That is what this ABM program we are presenting to you today is all about, Senator—to protect the deterrent capability that we have. We think that is the best way to prevent war, and the best way to protect our people.

Senator CHURCH. Mr. Secretary, if you can persuade me on that point I will support your program.

Secretary LAIRD. Thank you.

Senator CHURCH. I certainly will.

Secretary LAIRD. Thank you.

Senator CHURCH. But up until now I find it very difficult to follow your reasoning.

Secretary LAIRD. I am sure, Senator, we can convince you.

ABILITY TO STRENGTHEN CREDIBLE DETERRENCE DOUBTED

Senator CHURCH. I am just afraid, Mr. Secretary, we shall build a system that will cost a great deal of money, and that, in the end will be far less a shield than a sieve, and one that could actually give the Russians the wrong idea. I wouldn't want us to do anything that, in the end, might weaken the credibility of our deterrent.

Secretary LAIRD. Well, I agree with you completely. If I thought for a minute that this weakened the credibility of our deterrent, I would not support it. But the reason I support it is that I think it strengthens the credibility of our deterrent, it strengthens our ability to prevent nuclear war, and it strengthens our ability to protect the people of this country.

Senator CHURCH. That is the issue.

Senator GORE. Mr. Secretary, I respectfully disagree. I think there is a strong possibility that it would weaken the credibility of our deterrents, that it would make an international arms limitation agreement more difficult, if not impossible, either to achieve or to monitor after it was achieved.

There is just one more question that I wish to explore and then I am resigned to have the charts.

CAPABILITY OF SOVIET SS–9

You spoke a good deal this morning about the power of the SS–9. Now, will an SS–9 have the capability of destroying more than one Minuteman missile?

Secretary LAIRD. Of course it depends, as you know, Senator, upon the number of warheads that the SS–9 carries.

Senator GORE. You said this morning that it was possible that it could carry four or five.

Secretary LAIRD. I wouldn't want to discount that but I am not saying that such a missile is deployed today. There have been tests by the Soviets with multiple warheads, but, Senator, I would rather not get into the numbers. I am not trying to hedge on this, Senator, but I think there are certain things that we should discuss publicly and there are certain things that perhaps can go unsaid as far as the public record is concerned. I felt it was important to let the public, this committee and the Armed Services Committee know exactly what the capability of the SS–9 was as far as megatonnage is concerned. When you go from a single 20 to 25 megaton warhead in an SS–9 into mul-

tiple warheads, the size of your multiple warheads as far as the explosive power of those warheads is concerned does not go down in the same ratio. I am sure you understand that.

Senator GORE. I understand that. I understand what you mean. I am not asking you to discuss anything that you haven't said publicly. You said that the SS–9 had a warhead of 20 to 25 megatons.

Secretary LAIRD. Well, we will show you in chart No. 10 exactly how this works.

Senator GORE. I think we should have those charts.

Secretary LAIRD. I would like to call on the Deputy Secretary of Defense to make that presentation.

Senator GORE. Senator Fulbright had some questions.

IZVESTIA ARTICLE

Senator FULBRIGHT. First I want to put in the record a statement from a March 13 report of an Izvestia article referring to this. I read one sentence: "The balance of power now achieved provides an opportunity for concluding agreements on freezing and curtailing nuclear arms."

I ask that those two paragraphs be put in. I am not sure you are correct in saying the Russians are not at all concerned about this. Their statement would indicate that they feel this current balance is a proper one in which to start negotiations.

(Excerpt from article referred to follows:)

[From the text of article on disarmament, Moscow, Izvestiya, Mar. 13, 1969]

[Article by IZVESTIYA political observer V. Matveyev: "Armament and Disarmament", names in parentheses as transliterated]

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Words, of course, are not enough. Moreover, different speeches are heard from the highest platforms in the United States. Their authors suggest that there should be "no hurry" for these talks, and they call for creating a "position of strength" and so on. Calling for speeding up the arms race and developing the Sentinel system, these leaders refer to the absence of agreement with the USSR on these questions.

However, it is well known that the Soviet Government proposes that negotiations be started on limiting and curtailing both offensive and defensive nuclear weapons. Steps that might be taken in the disarmament field should not place one state or group of states in an unfavorable position with respect to other states. The balance of power now achieved provides an opportunity for concluding agreements on freezing and curtailing nuclear arms. Many Western observers point this out.

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CANADIAN ATTITUDE TOWARD DEPLOYMENT OF ABM SYSTEM

Senator FULBRIGHT. There is one important question I would like to ask you, in view of the plan to place these two ABM sites primarily in North Dakota and Montana. Do you have the agreement of the Canadians that it is all right to explode these Sprints and Spartans over Canada?

Secretary LAIRD. Well, Senator Fulbright, I was filled in in some detail on this particular matter. It was my understanding that before the Sentinel system was presented to the Congress and approved last year that Secretary McNamara, State Department officials, and others discussed this with the Canadians. There has been no change as far as

the relationship with Canada is concerned, from the system that was approved by the Senate and the House last year and the system that we are proposing today.

I was advised completely and fully. Dr. Foster, I think, took part in some of those discussions, and perhaps he could add further information on that question.

Dr. Foster?

Senator FULBRIGHT. There was a debate in the House of Commons in Canada within the week on this matter indicating that they do not feel they approved this. This is a different system in any case.

Secretary LAIRD. Well, Senator, it is not different as far as the Sprint and Spartan missiles are concerned and it is not different as far as its affecting Canada is concerned. I do not want to give anyone the impression that it is different as far as Canada is involved, and I don't think we should give Canada that impression in any way.

Senator FULBRIGHT. You are saying that the Canadians have approved the operation of these ABMs, and if this operation requires explosions over their country, that it is all right with them? Are you saying that?

Secretary LAIRD. Senator Fulbright, I was not part of the administration in which the talks took place.

Senator FULBRIGHT. No, but you know about it.

Secretary LAIRD. Dr. Foster was a part of the administration at that time and was involved in the discussions. I would like to call on him.

Senator FULBRIGHT. This shouldn't take long. Answer, have they or haven't they?

Dr. FOSTER. Senator Fulbright, I was in the conference of officers from Canada and from the United States which described the Sentinel program at that time.

Following that description, the Canadians understood the protection which a large fraction of the Canadian population would get from this system. They understood the effects that it would have on the ground as far as property and personnel are concerned.

Senator FULBRIGHT. Are you talking about the Sentinel or the present system?

Dr. FOSTER. Sentinel. And the government agreed. The government of Canada agreed to go along with that system. [Subsequently, the Defense Department amended this answer by deleting the two references to "agreed," so that the corrected answer would read: "The Government of Canada did not object to our going ahead with that system."] It was discussed in Parliament at that time.

Now, Secretary Laird is correct in stating that the system does not change with regard to Canada if we modify the Sentinel to its current configuration.

Secretary LAIRD. There is absolutely no change as far as Canada is concerned. There is a change in the configuration of the system as far as the United States is concerned but, Senator Fulbright, I do want to make it very clear that as far as the United States-Canadian consultation arrangements are concerned there has been absolutely no change.

STATEMENT BY CANADIAN PRIME MINISTER

Senator FULBRIGHT. I do not know about the change, but the Prime Minister of Canada said on March 19, which was not very long ago, and I quote—that is assuming the New York Times is reasonably accurate " 'We weren't consulted about this at all,' the Prime Minister told the news reporter as he left the House of Commons this afternoon."

Secretary LAIRD. Senator Fulbright, I think he is talking about the deployment of the system, the initial deployment of the system in the United States.

Senator FULBRIGHT. "Prime Minister Pierre Elliott Trudeau categorically denied today that his Government had been asked by the United States for permission to fire antimissile missiles over Canadian soil."

I do not know what you asked them, but it seems to me it is fairly clear what is involved.

Secretary LAIRD. Well, Senator Fulbright, I just want you to know that——

Senator FULBRIGHT. I will put the whole article in the record.

Secretary LAIRD.—that the preceding administration—and I have been filled in on this in detail—did present this program to the Canadian Government.

Now, as far as the change in the location of the missile sites down here in the United States is concerned, we did not think it was necessary to clear the change in locations once we had consulted on the use of the Spartan and the Sprint.

(The article referred to follows:)

[From The New York Times, Mar. 20, 1969]

MISSILE DISPUTE ERUPTS IN CANADA—PRIME MINISTER DENIES U.S. CONSULTED ON OVERFLIGHTS

OTTAWA, MARCH 19—Prime Minister Pierre Elliot Trudeau categorically denied today that his Government had been asked by the United States for permission to fire antimissile missiles over Canadian soil.

"We weren't consulted about this at all," the Prime Minister told the news reporters as he left the House of Commons this afternoon.

A report published this morning in The New York Times precipitated an outburst of questions from Opposition ranks in Commons. Then, accepting a motion made by T. C. Douglas, leader of the New Democratic party, the Commons speaker, Lucien Lamourex ordered an emergency debate.

The published report from Washington said the Defense Department had indicated that the United States was seeking Canadian approval to fire antimissile warheads over Canadian territory should Soviet or Chinese force attack the United States.

CONSULTATION IS DENIED

Mr. Trudeau and Mitchell Sharp, Secretary of State for External Affairs repeated earlier statements that Canada was informed of President Nixon's announcement of last Friday, 24 hours in advance, but not consulted.

Mr. Sharp told the Commons this afternoon when he was questioned by Robert Stanfield, leader of the Conservative Opposition, that the question of permission to fire antimissile missiles over Canada "has never been raised by the United States with this country.

Mr. Sharp then read from the Times report statements attributed to the Defense Department that discussions between the United States and Canada are held on a continuing basis on a number of aero-space matters, including antimissile matters, and that specific comment on them would be inappropriate.

Mr. Douglas asked how long these discussions had been going on and if they had begun before Mr. Nixon's announcement.

"These discussions have been going on for years," Mr. Sharp replied.

QUESTION OF PERMISSION

Some Ottawa officials did not consider the question of Canadian approval a serious one. Many, when asked for an opinion took it for granted that, if Russia or China began a nuclear war with the United States missiles would be fired over Canada whether Canadians approved or not. If [copy illegible] the United States to get our permission to counterfire, shouldn't we also ask the Russians or the Chinese to get our permission for the opening missile" one official asked.

"Can you imagine," he went on, "President Nixon saying to Mr. Trudeau 'The missiles are coming; may we have your permission to fire missiles back?' "

In comment since last Friday, Mr. Trudeau has expressed concern more about the effects the American antimissile program might have on world peace than on Canada. He has let be known to aides, and on one or two occasions to reporters, that he wants to take up long-range peace prospects when he sees Mr. Nixon in Washington next Monday and Tuesday, not short-range tactical problems.

DANGER OF ARMS RACE

In an exchange with reporters Monday afternoon, Mr. Trudeau was asked if he approved Mr. Nixon's decision to build an antimissile system.

"My personal reaction," he replied, "is that we don't do anything which would escalate the danger of war and escalate the arms race. The question is, how do you assess this latest step by the Americans? Is it an escalation or is it a keeping up with what the Russians have done outside of Moscow—and this is what our assessment will have to take into account."

Mr. Trudeau said he did not consider the primary concern to be "a little more protection for Canadian soil."

"We are first concerned with the peace of the world," he said, "because if these [missiles] are ever brought into use it will mean that we're in a nuclear holocaust, and then I don't think it will much matter whether one or two more Canadian cities are preserved if the whole world is going to be destroyed."

Mr. Trudeau, who has had a far-reaching review of Canadian foreign policy under way ever since he came to power 10 months ago, expressed "surprise" that the Nixon Administration had made up its mind about a missile program so soon.

CONSIDERATION OF CANADIAN OPINION

Senator FULBRIGHT. Does this mean that your policy is, if the Canadians were to say, "We don't like this system, we think it is of minimal importance, and we don't want these Spartans exploded over our country," you would drop the system?

Secretary LAIRD. Well, Senator, this is an area where I would hope that we could have discussions with our friends in Canada, if this does arise. I do not believe that we should put that kind of veto power in the hands of the Canadian Government at this time.

Now, if further negotiations are required on that point, I am sure that these two great friends will be able to work out satisfactory agreements. I do not believe that it would serve any useful purpose for me to answer your question in the affirmative or negative at this time.

Senator FULBRIGHT. You have answered it. You said that they should not have a veto. If they do not like it, they can lump it, that is what you said. [Laughter.] And I do not agree with you. I think you could also——

And I do not agree with you. I think you could also——

CONSULTATION ARRANGEMENT WITH THE CANADIANS

Secretary LAIRD. I would just like to say, Senator, that we have a working arrangement about consultation with the Canadians, and I do not want anything to jeopardize that working arrangement. I am

sure that we will be having discussions again within the next few weeks with our friends.

Senator FULBRIGHT. It is very strange that their Prime Minister never heard of it. It is most unusual.

Secretary LAIRD. Well, I would be surprised that he had not been fully briefed on this particular consultation arrangement.

Senator FULBRIGHT. I suppose it was classified. [Laughter.]

Secretary LAIRD. Well, Senator, I can assure you that we have a working arrangement on consultation with our friends in Canada, and I do know that this subject was discussed with them. As to the location of sites—we have never cleared the location of sites within the United States with the Canadians. This is something that we felt was not necessary.

Senator FULBRIGHT. With the development of FOBS, if you are going to use it against FOBS, you could have the same problem, I suppose, with Mexico or any other neighboring country. It seems this presents a very difficult problem.

Secretary LAIRD. With the submarine launched ballistic missile, too, Senator, we are in an area where it does not only apply to Canada. The old system involved Canada, where we had this consultation arrangement. This system with radars that go 360°, protects our east coast and west coast and protects the South. But I want to assure you, sir, so there is no misunderstanding, that the Canadians were fully advised as to the Spartan and the Sprint missile program—and I know of the article to which you refer; it first appeared in the New York Times and then it was picked up I think by one of the wire services—and I can assure you that we did have consultations with the Canadians. But we never had an understanding with the Canadians that they could veto our site selections here in the United States.

Senator FULBRIGHT. I have the official communique from the Canadian Embassy, which is dated March 16, and it gives in more detail exactly what was said in the exchange in Parliament between Mr. Douglas, Mr. Trudeau, and Mr. Diefenbaker. I think it ought to be in the record for the information of the subcommittee.

Secretary LAIRD. Fine, Senator. I would like to put in the record a brief of the discussions that did take place, and I think it would be well for the record to show that.

(The communique referred to follows. See p. 249 for DOD brief.)

CANADIAN EMBASSY—AMBASSADE DU CANADA,
INFORMATION OFFICE,
Washington, D.C., March 18, 1969.

CANADA AND THE ABM

[The following exchange on the U.S. decision on the deployment of the anti-ballistic missile system took place in the Canadian Parliament, March 17, 1969.]

Prime Minister: We have begun to consider the consequences of that decision which was announced only at the end of last week. I am not in a position today to indicate the considerations which might follow from it except perhaps to say that we are of the view that the important factor to consider in all this is that we ought to avoid an escalation of nuclear weapons. That remains our position. We are not yet in a position to say where, in our view, the decision that has been taken will lead to.

Mr. Stanfield (PC), (leader of the opposition): Since the installation of the new system will mean that interceptions will take place over Canada, is the Prime Minister free to tell the House whether the Government of the United States consulted the Government of Canada on this matter and whether Canada made any representations to the United States in this regard?

Mr. Trudeau: There has been consultation on this at various stages. But I am not prepared today to state that the considerations of Canadian safety which might follow from this position are more important than considerations of the safety and future of the world. In other words, I do not want to be put in the position where, in arguing the Canadian point of view from the standpoint of considerations of fallout in Canada, we should be precluded from saying that we do not want this kind of defence at all. I hope that is clear. I do not want to argue the Canadian case if it means a little more protection for us and therefore less protection for the peace and future of the world. Therefore I cannot answer the question.

Mr. Stanfield: Considering that Mr. G. Ignatieff, our chief disarmament negotiator, has stated that Canada is in the most dangerous position of any country, the danger stemming from the arms race between the USA and the USSR, and that advances in weapons technology, presumably including the ABM system, require further studies and are not being studied as they ought to be, and considering that Canada is most vitally interested in this matter, is it the intention of the Government to set up an interdepartmental task force or take other action to insure that it is fully conversant at all times with the implications for Canada of these new weapons developments?

Mr. Trudeau: I repeat that this kind of consideration has been given by the Canadian Government at previous states, according to the knowledge we had then. With a new announcement we will continue the consideration. I repeat, however, that Canadian interest is not more important than the interest of humanity in this subject. I do not want to take a position which, by promoting Canadian interests, would mean we are approving any USA escalation of anti-ballistic missiles. I do not want, in other words, to negotiate with the USA for a little more protection for Canada if I feel that that protection is such that it might entail more danger for the whole world.

Mr. Douglas (NDP): Since the first two ABM bases to be established will be at Grand Forks, North Dakota and Great Falls, Montana, both close to the Canadian border, may I ask the Prime Minister whether there was any consultation or whether prior information was given to him or any department of the Government before President Nixon made his announcement that the USA was considering establishing these ABM bases?

Mr. Trudeau: No. We were notified of the decision but there was no consultation in the sense that we might have been in a position to change the decision.

Mr. Douglas: Since any interception of Soviet missiles will in all probability take place over Canadian soil, may I ask the Prime Minister whether the Government intends to hold discussions with the USA Government in order to safeguard the interests of the Canadian people?

Mr. Trudeau: The Leader of the NDP is asking me to repeat the answer I have just given to the Leader of the Opposition.

Mr. Douglas: The Prime Minister is under the misapprehension that I am asking the question asked by the Leader of the Opposition. I am asking if there will be, not if there have been, discussions between the Government of Canada and the Government of the United States on this important matter.

Mr. Trudeau: I said that there had been consultation, in the sense that the United States had kept us informed at various stages and that we were going to discuss it. I repeat once again I do not think the problem of Canadian interest or even the constituency of the Right Honourable Member who sits to the right of the Leader of the New Democratic Party (Mr. Diefenbaker) takes first place over the interest of peace and sanity in the world. I am not interested in protect a few Canadian cities if this means we will be consenting to a kind of policy which we think is dangerous to the world.

Mr. Douglas: Can I ask the Prime Minister if any facilities of NORAD, particularly the warning systems, will be integrated with these anti-ballistic missiles? If so, is Canada to be consulted with respect to the use of the NORAD facilities?

Mr. Trudeau: If course Canada would have to be consulted before this system is integrated. If it were to be integrated into NORAD the present situation is

that NORAD does not cover anti-ballistic missiles and it could not cover the anti-ballistic missiles system without our giving consent.

Mr. Diefenbaker (PC): The Prime Minister has said that proliferation of nuclear weapons is one thing to which he is strongly opposed. I am glad to note the change in attitude since 1963 in that regard on the part of the Liberal Government. I would like to ask the Prime Minister if any consideration is being given to placing before the United States the suggestion that instead of having these installations at Grand Forks, North Dakota and Maelstrom Air Force Base in Great Falls, Montana, that they be placed further south? According to the President of the United States, they are to be placed in these locations. This will mean that incoming Russian missiles aimed at these two bases would actually bring about fallout in an area stretching from Penticton to Edmonton, then to Saskatoon, north to Prince Albert and also to Lake Winnipeg and Fort William.

Mr. Trudeau: The questions from the Opposition, all seem to lead to the same thing. They want to protect a particular city. I am more interested in seeing that the policy which is followed by the United States is one that protects all of humanity, not the people of Prince Albert alone.

Mr. Diefenbaker: They don't need any protection.

Mr. Trudeau: The truth of the matter is that if these installations are used, the whole policy will have failed as will have humanity. This kind of a secondary question whether one city is covered or not——

Mr. Diefenbaker: There was no such suggestion. The suggestion was that if these two bases were moved south into the United States, then the fallout would be over the United States instead of covering the area of Western Canada.

(Later) Mr. Diefenbaker: My question is to the Secretary of State for External Affairs and it has to do with the establishment of these two ABM installations in Montana and North Dakota. Did our partner in NORAD advise the Government of Canada of its intention to establish these installations and, if so, will the Minister say when he, as the responsible Minister for foreign affairs, first received notification of the decision by the United States in this regard?

Secretary of State, for External Affairs (Sharp): We were told of the decision immediately before it was announced.

Mr. Diefenbaker: Does that mean before it was announced by President Nixon and that until that date our partner in NORAD gave Canada no information?

Mr. Sharp: As the Right Honourable Gentleman knows, there have been many discussions about the Sentinel system which involved, as I understand it, many days and weeks of discussion in the United States. The President, who had the responsibility, announced the other day the decision he made to change the nature of the plans which had been talked about at one time. We were informed just in advance of his public announcement.

Of course, we shall be having some discussion with the United States. The Prime Minister will be talking to the President when he sees him next week. This will be one of a good many other matters discussed. I can only repeat what the Prime Minister has said, that the purpose of any of these undertakings is that they shall never be used. If they are used they will have failed.

Therefore I think we all must look at this problem in its very widest context, namely to avoid a nuclear conflict.

Mr. Stanfield: I should like to ask the Prime Minister a question arising from his answers to my previous questions upon which I have been reflecting. Did he mean to indicate that it is the view of his Government that the ABM system and the decision of the President of the United States does in fact escalate the chance of conflict and is in fact a threat of some sort to world peace? Is that what the Prime Minister meant to indicate?

Mr. Trudeau: No.

Mr. Douglas: Were there any discussions between his Department and the Government of the United States as to whether or not NORAD facilities would in any way be involved; and can he assure the House that as a result of those discussions neither the warning system nor any part of the NORAD system is involved in this ABM program?

Mr. Sharp: As the Prime Minister has said, Mr. Speaker, these are two separate matters, our NORAD agreement and the proposed system of ABMs around the cities or around the defence installations. As one of those who has joint responsibility for NORAD, we are not involved in the decisions of the United States on their ABM system.

NUMBER OF RUSSIAN SS–9S

Senator GORE. Before we call on Senator Case, I wonder if you can give me a quick answer how many SS–9s does Russia have?

Secretary LAIRD. Could I answer that in a general way?

Senator GORE. Sure.

Secretary LAIRD. It is over 200.

Senator GORE. And how fast do they manufacture them?

Secretary LAIRD. Senator, I will be glad to supply it for you.

[At the time of printing the information was not yet supplied.]

Senator GORE. You see the relevance of my question, if it takes one SS–9 for one Minuteman——

Secretary LAIRD. We have a chart here that gives you a rough estimate on the curve, and I think that curve will help in answering this question without further breaching this very delicate security question.

CONTINUATION OF HEARING

Senator GORE. I have been wanting to get to these charts. Let's have this understanding. I must leave at 4 p.m. and although I heard Secretary Packard's presentation on television yesterday, I have some questions. In case we don't get to Mr. Packard before I have to leave—and Senator Case would still have the statement by Senator Cooper, who is ill, I wonder, Secretary Packard, if you could come back Wednesday of next week and we could hear you exclusively in presenting this case?

Mr. PACKARD. We thank you, Mr. Chairman, I will see if this could be arranged. I appreciate your courtesy in suggesting it.

Senator GORE. While we have this interruption, I will ask Senator Fulbright to take over. I have a plane to catch. I am going to speak on the subject of ABM in Tennessee tonight. Will you take over? I will see you Wednesday, I hope.

Senator FULBRIGHT. Mr. Secretary, I am sorry that this program has become so interesting. You are such a good witness that we are spending much longer than usual in these hearings. You are a very interesting and persuasive witness. Since we are not proceeding to Mr. Packard, until next week, I have a few clarifications that I think I should pursue.

TESTIMONY OF SCIENTIFIC WITNESSES

When I suggested this morning that this subcommittee has not had before it supporters of the ABM concept, this was something which left the wrong impression and one of the reporters called it to my attention. I did not intend to leave that impression; it was a factual statement that those who did appear, with one exception, I believe, did not feel that this was a feasible program. It doesn't mean it absolutely wouldn't work. They didn't say it would not work.

Secretary LAIRD. I am sure.

Senator FULBRIGHT. Mr. Bethe made the point, that in dealing with nuclear weapons and dealing with bombers from experience in World War II, it has been learned there is a difference as to how many are used whether it is effective at all. But the fact is and I want the record to be clear that Senator Gore, as chairman of this subcommittee did ask Mr. Foster and General Starbird to open these hearings. But I am told that either he or you as their superior declined to allow them to appear. Is that correct? Is that not correct, Mr. Foster, that you were requested?

Secretary LAIRD. Mr. Chairman, I would like to respond to that question, because I was involved in it. I was asked by the Chairman, Senator Gore, to present the ABM case, the Sentinel case, before this committee as the opening witness, and Dr. Foster was going to present the details.

At the time the invitation was extended I talked with Senator Gore on several occasions and I told him that we would not have our decision until the 15th of March, and that I felt that we should present the new system rather than defend the old system. Because of the schedule before the National Security Council, and the fact that I was going to be gone for a week in Vietnam, he very graciously agreed to this date.

Senator FULBRIGHT. I didn't mean to raise this in criticism of you. I was the one who was responsible for the erroneous impression, having left the impression that the subcommittee had invited only people who were——

Secretary LAIRD. No. I understood you wanted some outside scientists and that is why I delivered——

Senator FULBRIGHT. I am not criticizing it. I wanted the record to show that the subcommittee had requested you and Dr. Foster.

Secretary LAIRD. The committee was very gracious in setting this date.

Senator FULBRIGHT. That is all I wanted to make clear; I am not criticizing.

Secretary LAIRD. To set this date on the 6th of March but we were not ready to make our presentation. We wanted to present the new system today.

Senator FULBRIGHT. And they did persuade Dr. Fink, a supporter of the system, who had recently been, if my memory serves me correctly, in the Department of Defense, and who presently works for one of the companies interested in manufacturing these items, to appear? I only wanted the record to show this because I don't want the impression left that the subcommittee had not requested administration witnesses and people who were not necessarily against the system.

Secretary LAIRD. The first request we had for outside witnesses I think was today and that is why I delivered the suggestions. But you are very gracious and we appreciate your arranging this date.

Senator FULBRIGHT. Well, I appreciate your coming.

ALTERNATIVE TO PARIS PEACE TALKS

Sometimes in the press of these questions one doesn't pursue these points. A man in my office who is watching this hearing on television said that this morning you said—but I didn't pursue it—"If the peace talks fail in Paris, this administration has an alternative in Vietnam." I didn't ask you to clarify what you had in mind. I think maybe you should clarify what you had in mind.

Secretary LAIRD. I think that is right, Senator. I don't believe this is the time to look toward failure in Paris. We are hopeful that we will have success in Paris, and that should be the position and the posture that we maintain insofar as our country is concerned.

Senator FULBRIGHT. But if there is a failure you said you do have an alternative. Could you clarify what the alternative is?

Secretary LAIRD. We certainly have to have plans in mind and in being to meet that contingency, but this is not the time to talk about failures in Paris. Let's hope that we have success.

Senator FULBRIGHT. I take it you don't wish to explore the question of what the alternative is at this time?

Secretary LAIRD. I think it would be a grave error.

ACTIVITY IN VIETNAM SINCE NEW ADMINISTRATION

Senator FULBRIGHT. A member of the press also called my attention to something that grew out of the morning discussion; that after President Johnson's announcement of the bombing halt in some areas of the I Corps, the North Vietnamese withdrew as much as 80 percent of their troop strength, withdrew it back either to Laos or Cambodia or perhaps to the north. It was also stated that there was a substantial increase in the activity initiated by the South Vietnamese Government, the ARVN troops and our own. You were very precise this morning in saying that after the inauguration of this administration, and after you took office there had been no increase in activity. Is that not correct?

Secretary LAIRD. Senator, I can assure you that there has been no escalation of the war in South Vietnam since the 20th of January.

Senator FULBRIGHT. Since the 20th of January.

Secretary LAIRD. Since the 20th of January.

Senator FULBRIGHT. What I want to make clear—I noticed that but apparently some didn't—this is not a denial that there was no escalation between November 1 and January 20; is it?

Secretary LAIRD. Well, I tried to limit my responses to the area of responsibility which I have as Secretary of Defense, I assumed this office on the 21st day of January. I limited my answer to the period in which I have had the responsibility.

Senator FULBRIGHT. I just want to make that clear. I think that is what you said this morning when this matter was raised.

I wonder if General Wheeler, who is familiar with these matters, could tell us whether or not there was an increase in the battalion strength missions after November 1 and to what extent by ARVN and the U.S. forces.

General WHEELER. Well, Mr. Chairman, following the Tet offensive the activity in South Vietnam declined, which had been the case in the past, there was a resurgence in May, and it declined, and then in August and September, there was a further resurgence of enemy activity.

The bombing cessation north of 19 degrees occurred on March 31, 1968, with the total bombing halt on November 1. Before that later period, the North Vietnamese had withdrawn elements of their forces—and I cannot confirm the 80 percent figure, I don't know where that came from—into North Vietnam, into Laos, and into their Cambodia sanctuaries.

This is their usual pattern of activity.

Senator FULBRIGHT. That took place after the bombing halt?

General WHEELER. Before and after, both, Mr. Chairman. The South Vietnamese and U.S. troops continued their operations of pushing out into the areas that had been overrun during the Tet offensive, and the later offensive by the VC and NVA. I do not think that I would describe that myself as an escalation of the war.

Senator FULBRIGHT. You would not describe that as a deescalation of the war.

General WHEELER. We continued our normal pattern of operations, Mr. Chairman.

Senator FULBRIGHT. After the bombing halt?

General WHEELER. Yes, sir.

Senator FULBRIGHT. Well, you didn't deescalate.

General WHEELER. No, sir, we did not.

Senator FULBRIGHT. You are saying you did not increase it either?

General WHEELER. No, sir, except as the improvement of the ARVN units took hold, they participated in more operations than they had participated in before.

Senator FULBRIGHT. The article I saw stated that the overall operations of the ARVN and the United States were substantially higher than they had been; is that correct?

General WHEELER. I don't recollect that it was, Mr. Chairman. I can check that and put it in the record for you.

Senator FULBRIGHT. Well, that would be useful if you would do that.

General WHEELER. I will do that.

Senator FULBRIGHT. As a matter of fact, I think I have some figures from the Pentagon indicating that, but it would be useful if you would check it.

Is it contrary to your rules to give us the type of order that was issued to General Abrams with regard to this matter? Whether or not he should step it up or whether he shouldn't? Was there any order that he should not step it up after the bombing halt?

General WHEELER. There were certainly no orders issued to him that he should reduce his operations.

Senator FULBRIGHT. There were not?

General WHEELER. There were none.

Senator FULBRIGHT. Well, that is something.

(The data referred to follows:)

COMPARATIVE LEVELS OF ALLIED GROUND OPERATIONS, BATTALION SIZED OR LARGER IN VIETNAM SINCE NOVEMBER 1, 1968

As a basis for comparison of allied levels of ground activity (Attachments A and B) show the number of battalion sized or larger operations for the sixteen week period prior to 1 November, 1968 as compared to the number for the sixteen week period after 1 November, 1968. The sixteen week period since 1 November, 1968 covers that period from the start of the bombing halt through the start of the current enemy offensive, 22 February 1969.

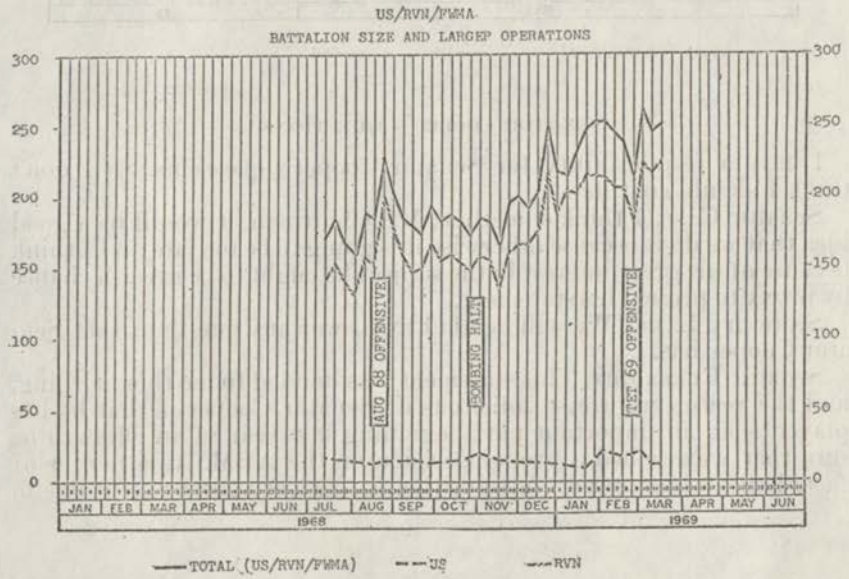
As the attached table and accompanying graph (Attachments A and B) indicate, there has been a gradual increase in South Vietnamese Army (ARVN) battalion sized operations and a slight decline in US battalion sized operations. This can be attributed to the ARVN modernization and improvement program as well as an overall improvement in ARVN performance since the enemy's 1968 TET offensive. As the ARVN has increased its size and effectiveness it has assumed a greater burden of the war and more responsibility for the security of the country.

While this data responds to the specific question, an additional table and graph (Attachments C and D) are provided which show battalion days of operation for the same time period. Battalion days of operation provide a better overall indication of allied ground activity since they reflect the actual days spent in the field. Attachments C and D also reflect the gradual increase in ARVN operations and the slight decline in US ground operations.

Allied Ground Operations (Battalion Sized or Larger) Weekly Average

14 July 1968–1 November 1968:		2 November 1968–22 February 1969:	
United States	14.9	United States	14.1
ARVN	156.7	ARVN	186.4
3d nation	1.9	3d nation	6.1
Combined	11.6	Combined	12.6
Total	185.1	Total	219.2

Attachment A

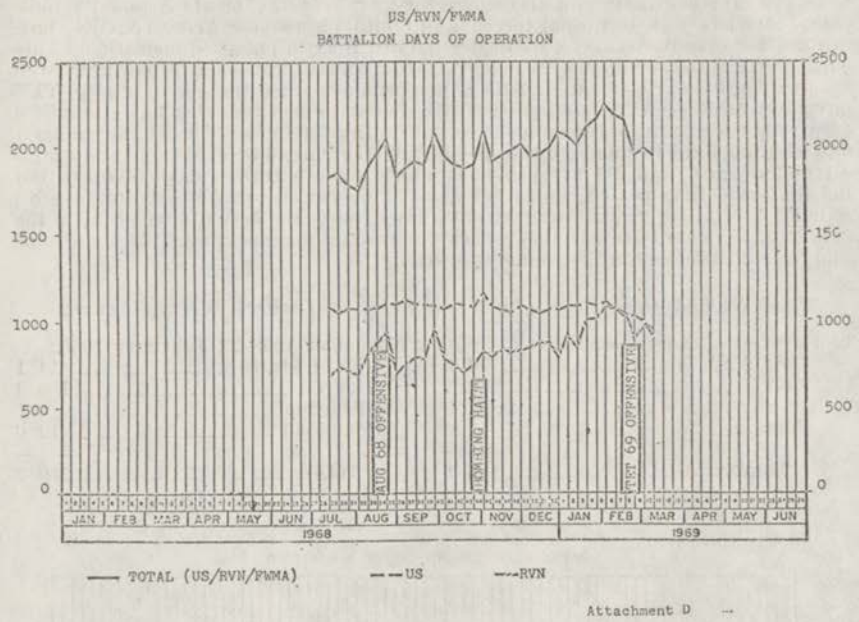


Attachment B

Allied Ground Operations (Battalion Days of Operation), Weekly Average

July 14, 1968 to Nov. 1 1968:		Nov. 2, 1968 to Feb. 22, 1969:	
United States	1088.2	United States	1065.5
ARVN	781.7	ARVN	906.5
3d nation	43.4	3d nation	66.5
Total	1913.3	Total	2038.5

Attachment C



Attachment D

SENATOR COOPER'S QUESTIONS

I have a responsibility for Senator Cooper's questions. So I don't think I should continue.

Senator CASE. I think sometime, Mr. Chairman, it would be a good idea that we do it because otherwise it is going to be too late and I think because of his great interest in the subject he ought to be given a chance by proxy to present his statement.

Secretary LAIRD. We will be glad to answer any questions that Senator Cooper has.

Senator FULBRIGHT. This statement was handed to me this morning, and the reason we are so solicitous of Senator Cooper is that he has played such an important part beginning last year in an effort to be sure that we reached a proper decision on the ABM. As a matter of fact, I think his present indisposition is to a very great extent due to

overexertion with regard to the ABM. He was so concerned that our Government not make a mistake in this connection that after working on the problem he was stricken with fatigue and taken to the hospital.

He asked that I read this. It is quite short, if you will bear with me. He said:

I respect very much the care and concern which President Nixon devoted to his decision upon the plans and the proposed deployment of an anti-ballistic-missile system, which has been designated as Safeguard. I will continue to study the proposed system as more information is presented to the Congress and the public. I ask consent that before the record is closed I may submit to the Secretary of Defense a series of questions for his response and that they be included in the record of the hearings.

I must say today that recognizing the earnest efforts of the President and his advisers to propose a system which would provide security without provoking a counteraction on the part of the Soviet Union and thus increasing the arms race, I do not believe the plan differs essentially from the original Sentinel plan. Safeguard includes the same elements—radars and interceptors—provides the same mixed and ineffective area defense and missile site protection and the same stimulus for future enlargement of other nuclear weapons systems.

The question which has not been answered satisfactorily by the Department of Defense, remains the same.

Is there any serious threat to the security of the United States or to the credibility of our nuclear deterrent from existing forces of the Soviet Union or Communist China or from the development of new nuclear weapons, or from research and development? Is there any credible intelligence of imminent danger or such increased danger—information that has not yet been made public, that it is now imperative that the United States commences deployment of a new system of nuclear weapons with the possible consequence of a new and higher level of the nuclear arms race. If there is such evidence which we have not yet heard—and we have been well briefed—Congress and the country should be informed before the Congress acts upon the bills providing authorizations and appropriations for deployment of an ABM system.

BEDROCK QUESTION

The bedrock question is whether the United States in the absence of agreed intelligence information of such danger will be the nation to take the first step in the deployment of a new system of nuclear weapons for both area and missile site defense, which if matched by the Soviet Union, as we must expect it would be, will set off an action-reaction pattern between our countries and vastly expand the nuclear arms race.

We should not take this initiative in the absence of certain intelligence information of danger and without an effort by our country and the Soviet Union to halt rather than deploy this new system. To do so, could be infinitely more dangerous to the security of our country and its people. To delay deployment of an ABM system, until a thorough examination has been made by a commission along the lines proposed by Dr. Killian, made up of distinguished leaders from both within the Administration and from the country at large, would lead to a decision that would have the confidence and support of the Congress and the people. We should continue to explore, study and debate this issue during this year at the least, so that we can come to a reasoned judgment.

That is the prepared statement.

DID PROTEST IN CITIES CAUSE ADMINISTRATION TO MODIFY SYSTEM?

He apparently was watching the hearings this morning on television in the hospital, and he dictated to one of his staff members this question:

You have not answered my question as to whether protest in the cities caused the Administration to modify its system, particularly its moving the system away from cities. If the success of the system demanded the location near the cities despite the protest, why move the missiles? If not, in effect the protest in the cities was a major factor in this decision and not a question of the merits of the system.

Would you care to comment on that?

Secretary LAIRD. I certainly would, Senator. We did not want to make this a provocative system, and we felt the continued deployment around the cities was provocative. We wanted to change the emphasis to make this system a purely defensive system because we felt that this was most important and, Senator——

Senator FULBRIGHT. Purely what?

Secretary LAIRD. Mr. Chairman, I would like to remind you that when you have an opportunity to see this presentation that we have worked out for your committee on this system—we have only been able to make our opening statement today—this presentation, I am sure, will convince you that we had a sound basis, well reasoned, for suggesting the changes. These changes were based upon sound technical reasons, from the standpoint of protecting our deterrent, from the standpoint of the credibility of our deterrent and from the standpoint of going forward with the arms talks. All those things were taken into consideration, and our presentation which Mr. Packard I hope will be able to give this committee at some later time—because we have not been able to present the system today—will, I am sure, answer that question of Senator Cooper's. I know of Senator Cooper's interest in this program. The very distinguished senior Senator from Kentucky has had a long interest in this matter, and I have great respect and admiration for his views. I am sure that this presentation—I hope he will be able to be present when it is made, because it will answer many of the very serious questions that the senior Senator from Kentucky has.

Senator FULBRIGHT. I thank the Secretary.

SAFEGUARD FAVORED OVER SENTINEL

Between Sentinel and Safeguard, except for the added cost, I think I would favor the Safeguard.

The trouble is I am not for either one of them. I voted against the Sentinel last year, and I would still vote against it for reasons that have already been explained. But if you must have one of these systems, I think maybe the modified one is better, although you really ought to build it at the cost of the original one.

Senator Case says he has received another question from Senator Cooper, and he would like to complete the record by reading it.

Secretary LAIRD. Well, I hope Senator Cooper is watching this afternoon.

Senator FULBRIGHT. He was, apparently, this morning.

Senator CASE. Indeed he was, Mr. Chairman. And he asked that these additional questions be presented to the Secretary and his associates.

Secretary LAIRD. Do you want me to answer these now?

Senator CASE. I would think you would want to, probably.

Secretary LAIRD. Yes, Senator Case.

Senator CASE. And then, if I may, I will leave the matter with him as to whether he wishes to restate the questions, if you and he do not understand them, for example.

Secretary LAIRD. I would be delighted. I certainly regret——

Senator CASE. You can answer them for the record.

Secretary LAIRD. (continuing). That Senator Cooper cannot be with us today, and I wish him well in the hospital.

Senator CASE. I am sure we all join in that, and I know he would appreciate it.

MUTUAL DETERRENCE

The first question that he sent to us is this:

We on the Committee have had intelligence about and briefings and have studied all the threats that you have disclosed recently before the Armed Services Committee and today before the Foreign Relations Committee. We have known about the research and development activities of the Soviet Union, which you have expressed in such alarming tones. We have known about the Galosh and its limited capabilities. We knew about FOBS before the Outer Space Treaty was concluded and were told by authorities such as yourself that it would not constitute a serious danger. We have known about their MIRV—in fact, we assumed that they would build a MIRV when we decided to build our MIRV. And we have known about SS–9 for some time.

Senator Cooper would like to quote a passage from hearings held before the Armed Services Committee just a year ago concerning the SS–9 and similar weapons. This answer was given by Dr. Enthoven in answer to a question by Senator Symington. The whole quotation from Dr. Enthoven should be included at this point in the record. But, I think, for our purposes right now, I need only quote his conclusion:

It is clear that we can continue to maintain our assured destruction capability against the Soviets. However, it is equally clear that the Soviets have the capability to maintain an assured destruction capability against us, and the indications are—

—and, I think, this is the point Senator Cooper had in mind particularly—

that they are designing most of their forces for this mission.

That is to say, assured destruction capability against us.

Thus, the situation is and is likely to remain one of mutual deterrence. Neither side is likely to be able to launch a pre-emptive attack that will take away the other side's ability to retaliate.

That ends the quotation from the testimony of a year ago.

(The excerpt from testimony before the Armed Services Committee's Preparedness Investigating Subcommittee, April 26, 1968 referred to follows:)

Dr. Enthoven. Their traditional interest in active air defenses, their deployment of an antiballistic missile (ABM) system around Moscow, and their rather extravagant investment in TALLIN-type anti-bomber defenses imply some concern for a damage limiting capability, particularly against the imagined threat of a U.S. first strike on their weapons and their cities.

For the most part, however, the Soviets appear to be developing a second-strike capability that is largely designed for assured destruction. The (deleted) ICBM could be used as a counterforce weapon against hard silos, but we estimate that they will deploy only about (deleted) of them by mid-1969. On the other hand, the (deleted) ICBM, on which they may deploy as many as (deleted) by mid-1969, will be too inaccurate and too low in yield (deleted) to be effective except as a counter-city weapon. Furthermore, they are apparently deploying a submarine-launched missile system (deleted)—sacrificing payload for survivability—and may be working on a mobile, land-based ICBM system. These would also be weapons designed for use against cities. Thus, we have to assess the strategic nuclear competition between the United States and the Soviet Union in light of the Soviets' increasing second-strike capability.

It is clear that we can continue to maintain our assured destruction capability against the Soviets. However, it is equally clear that the Soviets have the capacity to maintain an assured destruction capability against us, and the indications are that they are designing most of their forces for this mission. Thus, the situation is and is likely to remain one of mutual deterrence. Neither side is likely to be able to launch a preemptive attack that will take away the other sides ability to retaliate.

WHAT IS NEW EVIDENCE FOR DEPLOYING PRESENT SYSTEM?

Senator CASE. Senator Cooper continues:

Mr. Secretary, you have not told us anything yet which we have not known from briefings and from testimony from the Department of Defense in the past. What new threat, what new intelligence is there that provides some new basis for deploying this system?

Until there is such new evidence, I do not believe that deployment can be justified.

I think maybe I would give you these two. The last two are quite short, and then you can deal with them as you wish.

Secretary LAIRD. Could we deal with them one at a time? I think our viewers, as well as the committee, might understand the answers better.

Senator CASE. Whatever you think would be most satisfactory.

Secretary LAIRD. You go ahead, Senator.

ACTION-REACTION PHENOMENOM

Senator CASE. This is the second question:

Mr. Secretary, you have said that we should deploy a missile site defense because of the possibility of increased Soviet ICBM forces possibly equipped with their version of MIRV. Knowing that we have a MIRV and are deploying it, is it not probable that unless we enter into an agreement on nuclear arms limitation, we will have no other choice than to go ahead with this action-reaction phenomenon which has been so much a part of the nuclear arms race in the past 20 years?

NOT YET BEEN GIVEN FACTS FOR DEPLOYMENT

Senator CASE. Then the last question:

You said, Mr. Secretary, and were questioned by Senator Fulbright on this, that you have had to conclude that the Soviets were preparing a first strike because of their SS–9. If this is correct and the Soviets do intend a first strike, wouldn't the SS–9 if deployed and other weapons easily overwhelm even the full Safeguard defense you propose?

Isn't this ABM just an escalation of the arms race and another reason why we should make every effort to stop this senseless arms race? If it could be proven convincingly that an ABM system would provide protection, I would welcome the installation of an ABM in our cities and if it is effective, it ought to be put on the Capitol or on my own house. I think that we have not yet been given the facts

or any new information which would provide a good reason for going ahead with deployment of the proposed Safeguard system. Do you have any new facts?

Thank you.

Secretary LAIRD. Senator, if we can go through this presentation either today or tomorrow, I think you will find that the new facts are very striking. I mentioned several of them this morning. I am sure that our distinguished friend, the senior Senator from Kentucky, John Sherman Cooper, was really not aware of the fact that the Soviet Union, as late as December, has gone forward with the deployment of more SS–9s.

I kept up on this information on a very current basis as a member of the Defense Appropriations Committee, and I was not aware of this information until I became Secretary of Defense. The new information pertaining to October, November and December of last year has recently become available and I will present that information, and it will be presented to you in some detail at a later time.

But I can assure you that this new intelligence information—which is now available and which will be made available to every Member, and will be presented when we have the opportunity to make the full Sentinel presentation to this committee—will certainly satisfy Senator Cooper that we do have a very hard, strong, factual basis upon which we have made our decisions.

ABILITY OF SAFEGUARD TO PROTECT AGAINST SS–9 QUESTIONED

Senator CASE. I think I should emphasize just for clarity, it is my understanding that the main thrust of Senator Cooper's question in regard to the SS–9 is not so much, are they going to use a lot of them, but if they do, will the defensive system that you suggest be capable of protecting against such a strike by them at the missile bases in these two areas. I think that is the thrust of the question.

Secretary LAIRD. Yes, yes, they will, and we will be able to assure greater survivability for our missile force in the event that we are surprised; we will be able to have a greater deterrent force in the event we are surprised; we will be in the position so that we can deliver the kind of devastating retaliatory attack that will keep the Soviet Union or any other nation from attacking the United States. And our presentation, particularly this chart (See page 279) gives the curve reflecting these new missile deployments of the Soviet Union. But we will get into that later, Senator.

The Senator has invited us to come back, and make a presentation of the system at a later date, and explain the intelligence information upon which we have based our recommendations. We are pleased and delighted that we are going to have this opportunity to present the system to this committee.

Senator CASE. Thank you, Mr. Chairman.

I just have one other question for Senator Cooper, and then one of my own, and I shall desist, if that is all right.

FACTS THAT LED TO PRESENT DECISION

First, as to Senator Cooper, he raised the question that during the hearings on the Nonproliferation Treaty last month he asked that you

supply the committee with information that you developed in the process of your review of this whole matter, and he expresses the hope that you will send us that background material and a copy of the review and the facts that led to your decision. I just put that on the record for him at his request.

I am not exactly sure to what extent you have by what you have presented to us already met his point, but I think that will be helpful.

Secretary LAIRD. Well, we will be presenting all that material. We had planned to do it today, and we were prepared to do it today, but we got into the questioning here which, I think, is very helpful. But we will have an opportunity to bring that material to the committee.

I think it is important that the Foreign Relations Committee have full information to place before the Congress. I realize that the decision on this will be made, the recommendation will be made, by the Armed Services Committee of the Senate. But before the vote is taken on the floor of the Senate, it is my hope that this information will be available to as many Senators as possible, and we are delighted to have the opportunity to talk to all of you.

Senator CASE. Thank you, Mr. Secretary.

DEPLOYMENT OF MIRV—AND EFFECT ON ARMS TALKS

Now, on my own, just this one point, which goes back to the matter of the MIRV and the effect of our development of it, and the fact, too, that the Soviets are moving along in that direction, too.

As I said earlier, it seems to me the crucial question is, are we taking steps and actions which will make more difficult, perhaps even impossible, an agreement on arms stabilization and reduction?

It seems to me essential that we get along with this arms reduction agreement before we get to that point and, therefore, I ask you if you may tell us, since we are further ahead on MIRV than the Soviets, but we have not deployed it, how much time is there before this deployment; in other words, how much time before what seems to me may very well be the point of no return as far as arms reduction agreements go.

Is there a possible statement that you can give?

Secretary LAIRD. Yes, Senator Case.

This morning, as I responded to a question from the distinguished Senator from Rhode Island, Senator Pell, I explained that research and development on MIRV was started in 1963. This was done in our research and development budget. The decision on deployment was not made until a later date, but we had decided to go ahead with the research and development.

The decision on deployment was made, the initial deployment decision was made, in the administration of Secretary McNamara.

Senator Case, I think that we cannot abandon at this time the decision which was made by Secretary McNamara because of the testing that the Soviet Union is carrying forward. I do not believe that we can move in a unilateral fashion in this important strategic area.

Senator CASE. Mr. Secretary, I am just after facts. I am just wanting to know if you can tell me when we plan to deploy MIRV, when this point may be reached, if you can tell me. If you cannot, if there are

reasons that you have that you should not and do not want to tell me, that is fine. What I want to know is how much time we have in order——

Secretary LAIRD. We ought to be in a position——

Senator CASE. Will you let me, please, make clear my question before you answer.

STATE OF MIRV DEPLOYMENT

I want to know how long we have to negotiate this arms reduction, and I take it one very important point, which may be a point of no return, is when MIRV is deployed. So can you tell us when MIRV is likely to be deployed. If you cannot, then, of course, I do not press you.

Secretary LAIRD. Of course, I can, Senator, but I do not think we can put that date on the record now. If you would like that date I would have to give it to you, I believe, in executive session.

[Although the information is classified it had not been supplied at the time the hearing went to press.]

I am sure the members of this committee realize that we have not announced the operational date as far as MIRV is concerned. We may have announced it on the Poseidon. I am not sure. I do not think we have announced those dates, Senator Case, but it is not in the too distant future. I am sure the Senator from New Jersey understands the difficulty and the problem which I have in announcing those operational dates. I do not think it would serve the best interests of the United States or the entire free world to announce those operational dates at this hearing.

Senator CASE. Mr. Chairman, because I understand the Secretary is thoroughly conscious of what is or is not proper or even advisable to tell for security reasons, I have no hesitancy in asking the question. But my purpose in asking it was not really so much to find out the precise date, as to underscore, and I think we have done it by the Secretary's statement that "it is not in the too distant future," to underscore the extremely limited time we have to come to actual negotiations and the reaching of an agreement on the arms question, and this is my point.

Thank you very much.

Senator FULBRIGHT. The Senator from Missouri asks to be recognized for a few questions.

Senator SYMINGTON. Thank you, Mr. Chairman.

OBJECTION TO ABM DEPLOYMENT AT THIS TIME

Mr. Secretary, before these hearings close, I would emphasize that many of us, including Senator Cooper and myself, are anxious to proceed with research and development. Our opposition is to the deployment of this particular weapons system at this time.

I want to read a brief statement of mine written before these hearings started. I have been around, as have you, for some time in this defense field. This statement has to do with priorities.

"As a result of Vietnam, the United States is currently developing a conventional force capable of defeating countries of the size and

strength of Cuba or San Domingo, very possibly, North Vietnam, if the shackling rules established when the United States took over the war years ago had been taken off all three services; but not capable of waging successfuly a conventional war against a first-class military power.

"In passing, it becomes increasingly clear that now there is very little left in Vietnam to win.

"Inasmuch as this country, although the oldest of all democracies, is still relatively young, we would not surrender to an enemy until after expending all our strength.

"With that premise, it is my considered opinion that present policy could well be driving us into the very tragedy we all hope most earnestly to avoid, namely, the destruction of civilization as we know it as a result of a full nuclear exchange."

THREE MILITARY CATEGORIES WHICH SHOULD BE GIVEN TOP PRIORITIES

"As I see it, there are three military categories which should now be given top priority, so as to preserve the strength, the true deterrent capacity of the United States. In passing, this situation, if it is true, and I believe it to be true, is in no way your responsibility.

"First, the ending of all the technical arguments which have resulted in the United States being so far behind the Soviets in modern submarines (leaving out the Polaris)—so that in a reasonable number of years we have a submarine force equal to the Soviets.

"Second, ending of all the technical arguments with the consequent delay of over 10 years in the building of airplanes which would make it possible for the United States to control the air over the battle ground or any ground; and the building, instead of arguments, of modern combat aircraft to give our pilots a chance to control the air.

"Third, the certainty that, regardless of developments on the part of any possible enemy, the strategic forces of the United States, Polaris, Minuteman, bombers, MIRVs in the future with Poseidons, can survive a first strike and get through to destroy any aggressor.

"As is now generally known, we are seriously deficient in the first two categories, in relatively good shape with respect to the third."

I present this to you as my first and only suggestion since you took office.

One other point: on this chart (see page 279) you show here you have not taken into consideration the MIRV or the Poseidon in your figures, but you show the Soviet increase—perhaps I am wrong.

Secretary LAIRD. No, we have not. We have not taken into account the multiple warheads, either for the Soviets or for the United States, and I want that very clearly understood.

Senator SYMINGTON. Thanks.

Secretary LAIRD. Senator, I appreciate your comments, and the program which you suggest is an important program, and one which we certainly will consider. It adds billions of dollars to our budget, but I understand the necessity of going forward with new bombers and with the other defense weapons which you suggest, particularly the submarines.

Senator SYMINGTON. I did not suggest a new bomber, rather new planes so as to control the air. The reason I brought it up was to see more money go there, because I would hope there is more chance of a conventional war than a nuclear holocaust.

Secretary LAIRD. Well, with regard to the recommendations which you make for more submarines, I can assure you we will give that very careful and very thorough consideration.

Senator SYMINGTON. Thank you, Mr. Secretary.

Secretary LAIRD. I know you have had a long and distinguished career as a military expert, and your views and your recommendations will certainly be given full consideration by me.

Senator SYMINGTON. I only wish I had as distinguished a career as you have, and do not pretend to be any military expert. [Laughter.]

Senator FULBRIGHT. Senator Pell.

Senator PELL. Thank you.

VIEWS OF FORMER PRESIDENTIAL ADVISERS

In connection with the views of the scientists, I was struck with the exchange between the Chairman of our committee and the Secretary, and in the luncheon period I made an inquiry as to how many Presidential Science Advisers there have been since President Eisenhower first set up the post in 1957. There have only been five, but I guess there are no more carefully selected scientists or who have a more general grasp of the problems.

The interesting point here is, while the present Science Adviser obviously does not oppose the ABM system, all others do, without exception. Dr. Killian, when pressed on it, said he would like to have a commission set up to make a decision. But when, in an exchange, he was asked, "What would you do if you had to vote now?" he said he would vote against it.

Secretary LAIRD. Senator Pell, I would just like to say those comments were all made about another program, not the program we want to present to this committee.

Senator PELL. Forgive me, they were to the new Safeguard program of last week.

Secretary LAIRD. No, I regret to inform the distinguished Senator that we have not had an opportunity to make the presentation of this program to that distinguished group of scientists. We hope that we will have that opportunity, as we hope we will have the opportunity of presenting it to you.

Senator FULBRIGHT. If the Senator will yield, the Secretary is quite right about this. The first we heard about it was the day after we passed the Nonproliferation Treaty, so he is quite right. If you think there is any substantial difference in the two systems, at least in favor of this second one, why, he has a point.

Secretary LAIRD. I do not mean to disagree with the Senator.

Senator PELL. You may well be right.

Secretary LAIRD. But we have given these gentlemen a briefing——

Senator PELL. Right.

Secretary LAIRD. —but I think that most of their comments—and I have read their testimony, Senator Pell, and I have tried to keep myself informed on this whole matter—most of their testimony dealt with

not so much the scientific considerations but the political considerations and most of the political considerations that they directed their attention to in their testimony dealt with the old system.

Senator PELL. Then I would hope, Mr. Chairman, we would get the reactions of all four of these scientists, on the modified system.

Senator FULBRIGHT. We are asking the staff if it would be proper to request all of these scientists to present a revised or additional view in light of these new facts, the new system, or how, if at all, they would like to change their testimony.

Secretary LAIRD. They may very well oppose it, and I do not want to give the impression that they might support it. But I do feel that we have made significant changes, and in reading over their testimony I find that most of the political objections that they raise were directed at the other system.

REVIEW OF STRATEGIC POLICIES AND WEAPONS SYSTEMS

Senator CASE. May I just say on this point, too, that I am very pleased by the President's action in taking an adaptation of Dr. Killian's suggestion in regard to a review of our strategic policies and weapons systems. I think this is very much in the right direction. Thank you.

POLITICAL JUDGMENTS

Senator PELL. To pursue this thought a bit further, and bringing in political factors as well, I think it takes somebody who can understand both the political factors and the scientific factors to make a decision. I do not envy our President these decisions. We in the Congress, as you will recall from your years, very often have to make the same timely decisions as generalists, and the judgments we have to reach are political. While agreeing with you—I must say I do agree with you that Safeguard certainly improves our strategic position vis-a-vis the Soviet Union or China—we have to make the political judgment as to whether the deployment of this system will increase or decrease the possibility of war.

Your view is that it will decrease it. This is really where we have a question of judgment and a question of disagreement.

We do know, as brought out this morning, that to go ahead with this system we can certainly not move ahead with a complete or comprehensive nuclear test ban treaty until the system is installed in 1973.

That, to my mind, would be one retrogressive step. The other political judgment to make is what would be the effect in the Soviet Union.

Here I cannot resist bringing up a conversation that Senator Gore, who, were he here, should properly be mentioning this, and I had an hour and a half's talk with Premier Kosygin, and in the course of that conversation one of the points that he brought up spontaneously, with no reference to any specific individual, was the difficulty of negotiating from a situation where one country had, as he put it, not strength, but superiority over the other.

It is human nature, I think, if the Soviets were superior to us or had greater strength than we had we would not negotiate until we caught up. I think they feel the same way.

At the same time, they agree and we agree that we are in a moment of parity, a delicate balance of terror. Those of us who are concerned with this do not want to do anything to change that balance, and this is the basic political decision we have to make.

THREAT OF NUCLEAR BLACKMAIL

Now, going to a specific point here, 2 years ago, General Wheeler and I had an exchange, which was later declassified and published. It is now a public document. This concerns one of the threats that we could face, the threat of nuclear blackmail, and I asked General Wheeler whether from the viewpoint of nuclear blackmail, is it not conceivable that missiles could be planted within our cities, particularly the more sophisticated missiles, without having to penetrate any screen.

We were talking about Nike X, the name of the earlier system—and, in the event of actual threat, this could well be used as a device no matter how good our antiballistic missile screen was?

General Wheeler said this is a possibility. It certainly would be a relatively difficult task, but certainly not one that is impossible of accomplishment.

And later General Wheeler said, if they could get the devices into the country, assemble them and then fan them out, the answer is, "Yes," they could inflict a degree of damage.

So I think when you are talking about the possibility of the Chinese or nuclear blackmail, we have to recognize this really would have no effect upon such a threat.

Would you agree with that or not?

Secretary LAIRD. I would like to have General Wheeler comment on that in view of the fact that his testimony has been referred to, if the Senator would agree.

General WHEELER. Well, Senator Pell and I did have this exchange, and I did make those remarks, and I think the fact remains today that this is a possibility.

There are certain agencies that are engaged actively in attempting to see that situations such as this do not arise.

I believe, however, that the nuclear blackmail threat is far more likely to come in the form of a few missiles or a threat of a few missiles, than that particular type of activity, because if detected—and it could well be detected—I think that it would certainly draw a very vigorous response from us against the country which attempted this kind of an action, Senator.

Senator PELL. But also one would not know where these weapons came from either.

General WHEELER. Well, I would imagine that if you located the weapons, you would probably have a pretty good idea of where they came from, at least in the present day and age.

Senator PELL. If you located them, I would agree.

WEAPONS OF MASS DESTRUCTION ON SEABED

Finally, I was delighted to see the President's instructions to Mr. Gerard Smith in Geneva saying that we should move ahead to reach an agreement that would prohibit the emplacement or fixing of nu-

clear weapons or other weapons of mass destruction on the seabed, that is 70 percent of the earth's surface and so far free of such weapons.

I was wondering if the use of the term "emplacement or fixing of nuclear weapons or other weapons of mass destruction" could be enlarged upon. What other weapons of mass destruction are there? Were we thinking of biological warfare, or what?

Secretary LAIRD. Well, we were, I think, as far as the statement is concerned, dealing primarily with fixed-based nuclear weapons that were fixed on the ocean bed.

Now, there are possibilities in this area. That is why we have taken the position in these negotiations that we want to discuss this whole problem. There was no particular weapon in mind.

OCEAN SPACE TREATY

Senator PELL. I was struck, too, with the fact that it would seem that the differences are negotiable here with the Soviet Union. The Soviet Union, as you know, has tabled a draft treaty that goes further and would prohibit detection devices and other things on the ocean floor. But it would seem that certainly the fundamental point about prohibiting the emplacement of fixed weapons on the ocean floor is invoked, and I think this is another reason why we do not, from the political viewpoint, want to do anything to upset the possibility of achieving some form of ocean space treaty or settlement which, as you may know, I have been working on for about a year or two.

Secretary LAIRD. Yes, I do. I know of the Senator's interest in this whole area.

Senator PELL. Right.

Are you optimistic in this field of the seabed or not?

Secretary LAIRD. I do not want to appear as a pessimist. I was criticized a little bit this morning for being pessimistic in the report on my return from Southeast Asia.

I think that these negotiations will take some time, Senator. But we have shown our interest, we have shown our concern, and we hope that discussions can proceed.

Senator FULBRIGHT. May I say, that was not a criticism of you. I was only pointing out the great differences between you and what Admiral McCain and others said. It is no criticism. Yours is probably much more in accord with the facts than the others.

Secretary LAIRD. The Chairman knows very well that we have talked about Admiral McCain's article, and I was quizzed at some length at an earlier date regarding the Reader's Digest presentation. But I was responding to the Senator from Rhode Island. I would not like to fix a date as to when we could be successful with the sea bottom treaty.

Senator PELL. Thank you very much.

DAMAGE TO POPULATION BELOW A SPRINT EXPLOSION

Senator SYMINGTON. Inasmuch as the Sprint is designed in this system to catch the incoming missiles which the Spartans miss, is it not true that if the SS–9 was exploded just above the maximum range of the Sprint, people would be incinerated on the ground below it?

Secretary LAIRD. I would like to have Dr. Foster or Mr. Packard answer that question. They are technically capable in this area, and I am not.

Dr. FOSTER. Senator Symington, let me go through the presumed attack again.

An incoming attack would be rather sophisticated, with the enemy attempting to confuse the PAR and MSR radars as to the nature of the attack.

Senator SYMINGTON. Excuse me, Doctor, if one broke through to the Sprint position by avoiding the Spartans, my question is, if it were set to explode above the maximum range of the Sprint, would it not incinerate what was on the ground below it?

Dr. FOSTER. No, sir; it would not, if the yields were, say, in the 20-megaton range. If it were 20 megatons and exploded at the maximum range of Sprint, it would not be able to knock out the radars.

Senator SYMINGTON. I am not talking about knocking out the radars, but about killing people below by burning with a 25-megaton bomb. This is sort of a simple——

Dr. FOSTER. Yes; it could come to a altitude where there could be small fires started; there could be eye damage, but this would be terribly small compared with the destruction that would occur if one were to let such a warhead come down to, let us say, a 5,000-foot altitude.

Senator SYMINGTON. If you were living in Canada, or even close to the stations of North Dakota and Montana, would this be additional incentive to buy a little land in Florida?

Dr. FOSTER. No, sir; it would not, because if you assume your conditions, then it would be rather close to the Sentinel batteries and it would be over the United States and not over Canada.

Senator SYMINGTON. Well, if you are being right about the degree of the damage, a great scientist has misinformed me.

Dr. FOSTER. No, sir; I do not believe that we would differ on that. The facts are there. He would simply look at the altitudes that the Sprint can reach.

Senator SYMINGTON. He knew that, and I would say you differ with the information he told me.

Dr. FOSTER. Senator Symington, I believe it is possible to configure an attack whereby you could cause damage on the ground. There is no question of that.

Senator SYMINGTON. I will have a letter written on it, because he is the kind of person willing to back up what he says, which was that if a 25-megaton SS–9 exploded just above the maximum range of the Sprint it would incinerate—that was his word, not mine—everything below it. I do not mean by that, great buildings, comparable to what would happen from a fireball on the ground, but my impression was he felt it would kill everybody not protected.

Dr. FOSTER. No, Senator, respectfully, a 25-megaton yield exploded at an altitude of the maximum range of Sprint will not incinerate structures on the ground.

Senator SYMINGTON. I am glad to know that.

Dr. FOSTER. I will say, however, that it is possible, with a very sophisticated attack, and with preplanned and appropriate enemy war-

head fuzing, such a warhead could come in low enough so that when detonated it could cause damage on the ground—no question about it.

NATURE OF SOVIET ATTACK

Senator SYMINGTON. Is there any reason for you to believe that the Soviets, if they did attack, would not attack on a sophisticated, preplanned basis?

Dr. FOSTER. Sir, when you talk about the Soviets attacking, we have to describe just what it is that is being attacked. If you are talking about cities, that is one thing. We have already ruled out defense of cities against Soviet attack. If you are talking about SS–9s coming at bomber fields, we have plenty of warning time, so the alert bombers are off the field. Therefore, we are only considering the Minuteman.

When you consider the attack on Minuteman, we have both Spartan and Sprint to defend these Minuteman fields. I believe that we can use the Spartan and the Sprint successfully to save enough Minutemen so that in the minds of the Soviets the retaliatory——

Senator SYMINGTON. I understand. That was not my question. You believe in the ABM system. I understand.

Dr. FOSTER. No, sir; I was trying to indicate that I am prepared to admit that some Minuteman missiles will be destroyed. There will be damage on the ground; yet many Minutemen will survive.

Secretary LAIRD. Senator Symington, our presentation will show exactly why we can protect some of the Minuteman missiles. We do not say we can protect them all.

Senator SYMINGTON. Mr. Secretary, I saw your presentation yesterday in the Armed Services Committee. It was a fine presentation. But it did not convince me. All I was talking about in this instance was people on the ground. I asked a simple question, if an SS–9 was exploded above the maximum range of the Sprint after it got by the Spartans, would it "incinerate" the people on the ground.

CONSULTATIONS WITH CANADIAN AUTHORITIES

Senator FULBRIGHT. Mr. Secretary, I did not quite do justice to that matter concerning consultation with Canada. Just for the record, I want to read one further question and answer, because I think I may have overstated the case in that they were not advised of it.

This is Mr. Diefenbaker, this is in the Parliament on the 18th:

"Mr. Diefenbaker: My question is to the Secretary of State for External Affairs and it has to do with the establishment of these two ABM installations in Montana and North Dakota. Did our partner in NORAD advise the Government of Canada of its intention to establish these installations and, if so, will the Minister say when he, as a responsible Minister for Foreign Affairs, first received notification of the decision by the United States in this regard.

"The Secretary of State for External Affairs, Mr. Sharp: We were told of the decision immediately before it was announced." It goes on.

It is clear that you did notify them of it.

Secretary LAIRD. I will supply the information for the record.

Senator FULBRIGHT. We have put the whole thing in the record.

(The material referred to follows:)

DOD BRIEF ON UNITED STATES-CANADA CONSULTATION ON ABM QUESTIONS

Prior to the announcement of the SENTINEL system on 18 September 1967, the US and Canadian Governments consulted together on ABM questions and on the SENTINEL ABM plan.

On 5 April 1967, US Secretary of Defense McNamara met with Canadian Minister of National Defense Hellyer to discuss the state of US thinking on the question of deploying an ABM system in the US. Foreign Office and Defense officials of both sides participated in these discussions. Secretary McNamara explored with MOD Hellyer the potential implications for Canada of any US ABM deployment, including the possible effects of defensive nuclear bursts over Canada on individuals and property on the ground. Dr. Foster, the Defense Department's Director of Defense Research and Engineering, discussed a number of possible deployment options. He also described a potential ABM system consisting of area and terminal defense installations and the coverage provided by such installations.

The implications for Canada of relevant aspects of the proposed SENTINEL ABM system were discussed by Secretary McNamara and Minister Hellyer on 12 September 1967 (6 days prior to the US public announcement of the SENTINEL deployment decision). Representatives of the Canadian Ministry of External Affairs and of the Department of State also participated in these discussions. The purposes of the proposed SENTINEL deployment were examined with the Canadian representatives. US officials also described in considerable detail the central elements of the SENTINEL system and discussed with their Canadian counterparts the aspects of the proposed deployment most directly related to Canadian interests, including the ground effects in Canada of the use of the SPARTAN missile which would detonate outside the atmosphere.

The US Government informed the Canadian Government (and our other NATO Allies) of President Nixon's ABM decision on 14 March 1969, before it was announced. The modified SENTINEL (or SAFEGUARD) system is not substantially different from the original SENTINEL system with respect to its effects on Canadian territory. The two missile sites scheduled under phase one of the SAFEGUARD program are two of the sites that were included in the original SENTINEL program.

MEANING OF "SURPRISE ATTACK"

Senator CHURCH. Just one point I would like to clear up, if I might, Mr. Chairman.

Mr. Secretary, you have several times used the term, "surprise attack" and emphasized that with an ABM system there would be a higher survivability of our ICBMs after a surprise attack.

What do you mean by a "surprise attack"? I had thought that any full-scale attack on the United States would be detectable as it approaches; our whole warning system is set up for that purpose. Certainly we would not be atomized before we knew we had been hit.

What do you mean by "surprise attack"?

Secretary LAIRD. Well, Senator, I am hopeful that we would be able to react immediately to an attack. I would assume that any attack would be a surprise attack. But an attack that was successful as a surprise attack would be one where we did not have time, or the President did not have time, to react and unload our missile launchers.

I do not want to frighten people about this, I want the Soviet Union, and I want any potential aggressor to understand that we are going to be in a position where we will respond immediately.

But I also want them to understand that in the event the surprise is successful, and we have not been able to respond on time, that we will have a surviving force—we have one now and this has long been our policy—enough that we can deliver a devastating retaliatory attack upon any potential aggressor.

We think it is important to have this kind of a deterrent, and this is the capability that will protect our people and prevent nuclear war.

Senator, I want to make one thing clear—I talked to my mother during the noon hour, and she said, "People are going to get the idea that we are very close to some sort of an exchange by listening to this discussion we are having."—I want to be clear that our goal, Senator, is peace.

Senator CHURCH. Yes.

Secretary LAIRD. And our objective is to maintain peace. That is what this program is all about.

The way to maintain that peace, and the way to maintain a position where we do not have nuclear war, is to see that we have this proper deterrent force.

MAIN IDEA OF A DETERRENT

Senator CHURCH. That, Mr. Secretary, is what the argument is all about. We are all interested in maintaining peace, and deterrence is a substitute for defense.

I have been always told it had taken the place of defense, in the lexicon of the military, and the whole idea of the deterrent is to persuade the would-be enemy, in advance never to attack because of the certainty of utter destruction in the retaliation that would immediately follow such an attack. The question we keep coming back to—the point that the ABM is going to improve the credibility of our deterrent—I think is the unproven part of your case.

Now, perhaps you can prove it.

Secretary LAIRD. I think we can prove it to your satisfaction, Senator.

Senator CHURCH. But up to this time it remains, in my judgment, unproved.

Secretary LAIRD. Senator, if we can give this presentation to you from start to finish ——

Senator CHURCH. Yes.

Secretary LAIRD (continuing). I believe we can convince you.

Senator CHURCH. Fine.

Secretary LAIRD. We have not had that opportunity to date.

Senator CHURCH. I have not yet seen your charts, and I would want to see them in full.

ACCURACY OF THE SS–9

But one other thing I would like to clear up today relates to the SS–9s. I think we have created, in our discussion of the SS–9, the specter of a 25-megaton warhead which the Russians possess, but we do not.

Is it not true, just to put this in perspective, that at one time we did have a comparable weapon, transportable by plane, a 20- or 25-megaton bomb, and that we chose not to equip our missiles with this kind of warhead because we felt we had greater accuracy with our missiles?

Secretary LAIRD. That is not quite the reason, Senator. I will be glad ——

Senator CHURCH. Let me put the question and then give me your answer: is it not true that if a missile is twice as accurate the warhead

need only be one-fourth as large, or if a missile is three times as accurate its warhead need only be one-ninth as large?

Isn't there a relationship between the accuracy of the missile and the size of the warhead you need to put on it?

Secretary LAIRD. The important point here, Senator—and our presentation will show this to you—is that the accuracy of the Soviet SS–9 missile is greater than the accuracy of their smaller missile. That is what concerns me about the kind of accuracy which they have with the larger weapon and why it would seem to me that one SS–9 was directed against our missile sites. This is what has convinced me that it is necessary for us to move forward with some kind of protection around those missile sites.

We cannot protect our Minuteman sites merely by hardening them, with the accuracy that the Soviets have developed with this large weapons system. This is in the background of our whole presentation, the real reason for this change.

Now, as far as the size of our weapons——

REASON U.S. HAS NOT USED SIMILAR SIZED WARHEADS ON MISSILES

Senator CHURCH. The thing I want to get at is why have we not used warheads of this size on our missiles? There has been a reason for it, has there not, and I want you to state the reason. I want it emphasized.

Secretary LAIRD. There has been a reason. When we developed the Minuteman, we did not have the same kind of objective in mind as far as the kind of targets were concerned. We developed the Minuteman for use as a retaliatory force, not as a first-strike force.

There is also the question involved of the kind of payload that can be carried as far as the Minuteman is concerned.

Now, we have some older missiles, Titan missiles, which do have the capability of carrying a larger payload, but we have not done the kind of testing that the Soviets have in this area, as you know. But I believe that our warheads are capable enough for a retaliatory type of strike, and I do not want to raise any questions about that.

What concerns me are the large weapons the Soviets are developing, which leads me to believe—and we must protect against this—that they could be developing these as first-strike weapons.

Senator CHURCH. Thank you, Mr. Chairman.

Senator FULBRIGHT. Just one or two things, Mr. Secretary, which are not particularly important.

DEFENSE FIGURES INDICATING OFFENSIVE OPERATIONS IN VIETNAM

It is with regard to the operations I asked you and General Wheeler about. There are statistics on the war furnished to the committee by the Department of Defense. They do indicate that a substantial increase in activity by our side in the 3 months following the halt of the bombing of North Vietnam, and during that period, according to your own Department's statistics, the battalion size operations against the enemy increased from 809 to 1,077 or one-third; enemy soldiers killed in action went from 8,168 to 11,003, up 46 percent; and hamlets under Government control increased 7 percent; those under Viet Cong control went down 4½ percent.

This has been the allegation. I want to have the figures in the record. These are figures supplied to the committee staff by your Department, which would seem to indicate that there has been a substantial increase in the offensive operations of the South Vietnamese and the United States after November 1.

It does not, in this note, make the distinction whether it stopped on January 20 or not. Do I understand from your testimony that it did?

Secretary LAIRD. I would like to point out, Mr. Chairman, that attacks by the Viet Cong and the North Vietnamese have increased during this particular period of time. It might be well for us just to look at the post-Tet period of 1969 and compare it with the August offensive in 1968.

Senator FULBRIGHT. I am quite sure they have, recently.

Secretary LAIRD. Yes.

Senator FULBRIGHT. The articles in the New York Times and in the Washington Post, stated that immediately thereafter, as I mentioned a moment ago, there had been a withdrawal, I think it said, of 80 percent of the North Vietnamese out of I Corps.

Ambassador Harriman was reported in the March 6 New York Post to have said recently that the enemy offensive was essentially a response to our actions rather than an attempt to, and I quote from the article, "dictate the peace terms or to torpedo the talks," and that he warned the last administration that this reaction would occur if all-out pressure were put on the other side.

In his annual posture statement to the Congress in January, your predecessor, Secretary Clifford, stated, and I quote: "We will continue to seek ways to effect a reduction of hostilities, to lower the level of violence in South Vietnam."

And this raises these questions, of course, about who did it first. The importance of it is not to assess the blame in that sense. It is what effect this has upon the talks and the possibilities of a negotiated peace in Paris, that is concluded in Paris, about Vietnam, and it is relevant to that.

Secretary LAIRD. I will be glad to supply any figures the Senator would like to have as far as the enemy attacks are concerned. But there has been an escalation by the enemy.

Senator FULBRIGHT. Recently, there has been.

COMMANDING MILITARY AUTHORITY IN VIETNAM

On March 11 the Washington Post in a story concerning U.S. military action in Laos quoted you as saying, and I quote: "Our forces and our commanders are able to take necessary action to protect the safety of American troops. This policy has been pursued for some time in Vietnam. . . . I do not consider that an escalation."

In this connection, who grants the clearance for the U.S. military actions across the border into Laos, do you, or the President?

Secretary LAIRD. Well, the authority has been approved by the President and by me, but the authority is granted by General Abrams, who is the commander of all forces in South Vietnam.

I would just like to state, Mr. Chairman, that I was confronted by newsmen in South Vietnam about the Dewey Canyon operation in the

A Shau Valley in I Corps. I was asked if it was true that American personnel and South Vietnamese personnel had crossed the border.

It so happened that in this operation there were several newspapermen involved, plus a cameraman. I may have been criticized by some for stating what the facts were, but I am going to stay with the facts and maintain my credibility in this position. I told the reporters that this was the case. It is a matter of protective reaction as far as our troops are concerned. When American service personnel are under attack, where their lives are concerned and where casualties resulting from an attack can be substantially reduced, I believe that General Abrams should have this authority. It is used only as a matter of protective reaction as far as our own American personnel are concerned.

Senator FULBRIGHT. Approximately, how long has that authority existed?

Secretary LAIRD. That authority—General Wheeler advises me—has been in effect since 1965.

Senator FULBRIGHT. 1965.

The staff has just called to my attention that on March 7 I addressed a letter to you with inquiries about these very matters on operations, and we have not yet had a reply.

Do you think you might just answer that letter?

Secretary LAIRD. Well, I certainly will. I may have a little difficulty in getting that cleared by the State Department. [Laughter.]

Senator FULBRIGHT. Well, they cleared you on the Spanish bases mighty fast. I do not know why they cannot clear this.

Secretary LAIRD. There seems to be some kind of disagreement on whether I should make the kind of statement that I did make on this case. But I felt it was a question going right to the heart of the credibility of this administration, and having been in the position on your side of the table before, I am going to maintain my credibility in this position of Secretary of Defense.

NEGOTIATING A PHASED MUTUAL TROOP WITHDRAWAL

Senator FULBRIGHT. One last question. It is getting late now and I want to let you go: you said that the presentation given to you in Vietnam "was based on the premise that no reduction in U.S. personnel would be possible in the absence of total withdrawal of North Vietnamese troops." If this is your position, how do you think we can negotiate in Paris on a phased mutual withdrawal of American and North Vietnamese forces?

Secretary LAIRD. Mr. Chairman, that was exactly what I was talking about in my presentation. I believe in order for us to maintain any position in Paris we must continue to pursue a policy of mutual troop withdrawal at this time.

But if you will read further into my statement, you will find that I outlined the phase II program for the modernization of the South Vietnamese forces, which will enable them to take over a greater portion of the operations in South Vietnam. Funding for phase II was not included in the 1970 budget, and in my presentation before the Armed Services Committee, I asked for those funds so that we can move forward.

Senator FULBRIGHT. Mr. Secretary, that was the reason for my question.

It is so late, it seems to me that you have very little confidence that there will be a negotiated peace, and that the solution will not to be a diplomatic or a political one, but you expect it to be a military one and that, of course——

Secretary LAIRD. I hope the Senator does not draw any premature conclusions on what the alternative may be. There are several options available. But I believe we must continue in Paris, and I think it would be a great mistake to give anyone on any side of that conference table the idea that we were about to withdraw without some other solution as far as Vietnam is concerned.

Senator FULBRIGHT. Goodness knows I do not suggest that. I do not think we should withdraw, but we should reach an agreement. And I think there are certain conditions that would be necessary toward a settlement, as I said so often, similar to the Geneva Accords in which our leaving that country would be one of the conditions, one of the results. This is what disturbs me so much, because Senator Stennis apparently concludes from your testimony that we are going to be there a very, as he put it in the paper, long, long time.

All of this leads one to feel that there is very little hope of success. However, what I have said today was intended to encourage you to reach a settlement in Paris and not continue this war on, on and on and on, as we have watched it during the last few years.

Secretary LAIRD. I thank the Senator for his encouragement.

NEW VIETNAM POLICY URGED

Senator FULBRIGHT. I am trying to encourage you, give you some backing when you are arguing in those meetings in the White House, as they do in other centers of power. There is this division between the hawks and the doves, and being one of the doves, I am sure, I want to give you some backing so that they would not override you in your arguments. That is all my remarks are intended to do.

But seriously, they are to encourage you, because I think this is a disaster. I have said to you and the President and others, that there are so many things waiting on this decision, being held up. I do not think the new administration is going to make any progress, because it is a condition precedent to any genuine progress in so many, in practically all other, endeavors in this country, and that is why I keep harping on it.

I want to make it clear. I am not blaming you for all of this. I am just trying to encourage you and the new administration to take a new departure from the past and from the previous administration's policy.

For goodness sake, don't adopt a policy which has been proven a failure. There is not any doubt about it being a failure even to those who were administering it, and that is what we are encouraging you to do. I hope you will.

I must leave to go. The junior Senator from Missouri has requested the opportunity to ask one question; is that correct?

Senator EAGLETON. Yes, Mr. Chairman.

Senator FULBRIGHT. Mr. Eagleton, will you ask your question?

Senator EAGLETON. Thank you, Mr. Chairman.

M'NAMARA DECISION TO DEPLOY ANTI-CHINESE SYSTEM

I would like to ask one question, if I could, of General Wheeler, since my question will relate to events prior to January 20.

General, at the time the Defense Department was deciding whether to apply an ABM system, and continuing on up to January 20, 1969, the Defense Department had at least three options, I guess, open to it: to deploy no system whatsoever or, secondly, to deploy an ABM system around missile sites as a defense against the Soviets; or, three, to deploy an ABM system around large cities as a defense against an irrational Chinese attack.

My question is, General, why did the Defense Department select prior to January 20, 1969, only No. 3, and did not select No. 2 or both 2 and 3?

General WHEELER. The decision was made during the tenure of Secretary McNamara. It was first announced in a speech that he made on September 18, 1967.

At that time, he had come to two conclusions: one was that it was impossible to build a sufficiently leakproof thick system around our cities so that at least some missiles could not get through, and this would be, of course, very damaging to those cities.

At the same time, he had become concerned about the nuclear testing of the Chinese. He had become concerned about their progress in missile testing, and he concluded that a thin system, the Sentinel system, so-called, was the proper answer so as to be able to give area protection to our population throughout the period of the 1970s.

WHY WAS MISSILE SITE PROTECTION SYSTEM PREVIOUSLY REJECTED?

Senator EAGLETON. Well, General, trespassing with just one more question, Mr. Chairman, that justifies his selection of No. 3, as I have listed them, a shield around the cities, as defense against the Chinese.

My question basically was, why was it that he eliminated the system that is now being advocated by Secretary Laird, or why didn't he couple it together, why weren't there two proposals up until January 20, 1969, for both a city system and a missile site system such as currently?

General WHEELER. Senator, I think the basic reason was that the threat of the Soviet missiles which, by the way, will be covered in this particular presentation the Secretary has been mentioning today, or the very rapid buildup in their sea-launched ballistic missile force was not apparent at that time.

Senator EAGLETON. As of January 20, 1969?

General WHEELER. No. No—I am talking about the original decision date of 1967.

Senator EAGLETON. My question, General, not only related to the original decision but it was an ongoing decision, a continuing decision, unamended and unchanged at the time the administration went out of office on January 20, 1969.

Secretary of Defense Clifford or the Defense Department prior to that time did not recommend option No. 2 to deploy an ABM system around missile sites. Apparently they were satisfied until January 20 with the previous system.

General WHEELER. I think that the proper answer to that falls into two parts, Senator.

First, the Sentinel system had been approved and was at that time in the process of being constructed.

Secondly, much of the information that I referred to regarding the buildup in the missiles, particularly the large missiles, and in the sea-launched ballistic missile threat had not been thoroughly evaluated, analyzed and, you might say, its impact taken into account. This was done subsequent to January 20 by Secretaries Laird and Packard in a very intensive review.

Secretary LAIRD. I would like to add, if the Senator from Missouri will permit, that in all fairness to Secretary McNamara and to Secretary Clifford, not only was this information evaluated quite recently—and it is now also available to them—but even the system previously recommended involved missile site protection. I do not want the record to show that there was no missile site protection involved.

The real and main difference was that with the kind of deployment recommended by Secretaries McNamara and Clifford, you could go forward, if you chose at a later time with a thick ABM deployment around the cities. It was their thought, I think, that this overall option should remain available. We do not have that option available in our program.

Senator CHURCH. Mr. Secretary, I want to say on behalf of the Chairman who had to leave because of a previous appointment, you have spent a long day here testifying, and we all very much appreciate your testimony and that of the gentlemen you brought with you. We look forward to the completion of your testimony and the presentation of your charts when we meet again next time.

Secretary LAIRD. Well, Mr. Chairman, I would just like to say that I appreciate the most friendly manner in which the questioning has been handled today and the reception that I have received from all the members of this committee. It is deeply appreciated by me as a new member of President Nixon's cabinet, and I cannot say enough about how impressed and how appreciative I am for this most friendly reception.

Senator CHURCH. Thank you very much, Mr. Secretary.

(Whereupon, at 5:20 p.m., the subcommittee adjourned.)

STRATEGIC AND FOREIGN POLICY IMPLICATIONS OF ABM SYSTEMS

WEDNESDAY, MARCH 26, 1969

UNITED STATES SENATE,
SUBCOMMITTEE ON INTERNATIONAL ORGANIZATION
AND DISARMAMENT AFFAIRS OF THE
COMMITTEE ON FOREIGN RELATIONS,
Washington, D.C.

The subcommittee met, pursuant to recess, at 10:05 a.m., in room 318, Old Senate Office Building, Senator Albert Gore (chairman of the subcommittee) presiding.

Present: Senators Gore, Fulbright (chairman of the full committee), Church, Symington, Case, Aiken, and Javits.

Also present: Senator Kennedy.

Senator GORE. The subcommittee will come to order.

The subcommittee has the honor and pleasure of having the Deputy Secretary of Defense, Mr. Packard, this morning. Today is yours, and ours, Mr. Packard. The committee appreciates the diligence with which you have prepared your material. We understand you are bringing some new material today, and we welcome this. We will be pleased for you to proceed.

STATEMENT OF HON. DAVID PACKARD, DEPUTY SECRETARY OF DEFENSE

Mr. PACKARD. Thank you very much, Mr. Chairman, and members of the committee. It is a pleasure to respond to the invitation of the Subcommittee on Disarmament to appear today and continue the public examination of the ballistic missile defense issues. I want to explain the proposed Safeguard ABM and also discuss with you some of the findings of my own study of the complex and truly vital issues that involve the ABM. I know that these issues are much on the minds of the Members of the U.S. Senate. In fact, it was clear during the discussion here last Friday that the issues that appeared to me to be the most important in making a decision on the Safeguard program are the same issues which are receiving the most attention from you gentlemen. Specifically, I first sought—as you clearly are seeking—the answers to two key questions:

Will the Safeguard contribute significantly to the deterrence of nuclear war—or is there some better way?

Will the Safeguard program contribute significantly to meaningful arms control talks with the Soviet Union, or will it prove an obstacle?

I think that we need spend little time discussing the need either for

successful deterrence or for arms control. Surely all of us in this room—I hope all responsible persons in our country—believe that since we cannot protect ourselves during a massive nuclear attack we must bend our efforts to the deterrence of that war. And surely, we must all agree by now that our ultimate safety as a nation lies in workable agreements with other countries to control these fearsome weapons.

So let's move directly to the heart of the matter—the problems of deterrence and arms control. First, deterrence.

DETERRENCE OF NUCLEAR WAR

There is general agreement on what is necessary to deter a deliberate attack. We need to assure the potential aggressor that if he strikes us he will receive a retaliatory blow which will destroy him as a nation. We need the weapons to make good on that assurance. We must make clear that we have the ability and the will to use the weapons when they are needed.

Today we can guarantee—without any shadow of doubt on our part, or, I believe, on the part of the Soviet leaders—that we can set off the necessary number of explosions in the right places at the right time under any circumstances of war. To sustain that guarantee, however, we need hedges against the destruction that could result from a Soviet attack on us, hedges against mechanical problems, and hedges against false assumptions about our ability to create the necessary explosions. This is what we mean by a credible deterrent.

We can provide a credible deterrent in a number of ways. One which has often been suggested is the automatic quick retaliation. The theory is that we tell the Kremlin that if our radar detects Soviet missile warheads on their way to this country we will automatically launch our Minuteman and Polaris forces at him. To insure an automatic response and thus a credible response and thus the deterrent, our missiles might be launched by computer on signal from the radars. In the grim jargon of the deterrence business, this is a form of a "doomsday machine." It is automatic and inexorable and it dooms the country that launched the attack. There are many kinds of theoretical doomsday machines, each, at first glance, an excellent deterrent.

Both the United States and Soviet Union saw the problem of this kind of deterrent, however, when they installed their first, unprotected ICBMs. They were completely vulnerable to attack, so there was no choice except to plan to launch them before the attacking missiles arrived. To be useful deterrents, these old missiles had to be configured so they could launch on warning of attack.

Government leaders, in the executive and in the Congress, found the early American missile configuration to be completely unacceptable. It offered all of the terrifying defects of a doomsday machine: we could not be sure that the President had time to evaluate the attack before retaliation; we could not bring the missiles back to the pad if the warning proved to be wrong; and the launch guaranteed doomsday not only for our enemy but also for us—and even guaranteed it under circumstances in which the President might want to check the facts rather than shoot from the hip. Both we and the Soviet Union have moved away from missiles which could not survive an attack.

Since our early Atlas days we have made a great effort to insure not only that our deterrent force will work when it is needed but that it will work only when it is needed. I would like to compliment not only previous administration officials but also the many Members of the Congress who saw the launch-on-warning problem and found the proper solutions.

OTHER HEDGES AGAINST FAILURE OF DETERRENT

We have turned to other hedges against failure of our deterrent. For instance, we have added to the numbers of our deterrent weapons so that through sheer quantity alone we will be certain that a sufficient number will survive an enemy attack, that a sufficient number of the surviving missiles will be launched successfully, that a sufficient number will penetrate anticipated enemy defenses and that a sufficient number will be placed accurately and will explode to create the requisite destruction.

At each step, you can see, there is likely to be attrition to our missile warheads and to our bombs. But large numbers can compensate for the attrition. We have some 1,500 missiles and 550 bombers today which we believe are indeed sufficient to guarantee deterrence of the Soviet Union.

A further increase in the numbers of these weapons could be self-defeating, however. The Soviets do react to our weapon deployments as we react to theirs. If we were to continue to insure our deterrent by adding to those numbers, we would be inviting the Soviets to expand their own forces beyond current plans in order to keep up with us. This is the kind of arms race which we are seeking to avoid.

Another kind of hedge would lie in a successful bluff. We could even *reduce* our deterrent forces without any sure knowledge of what the Soviets intend and hope that the Soviets would continue to believe that we can still guarantee enough of the right kind of explosions. Or we could bluff merely by keeping existing forces despite the fact that the Soviets are improving their weapons.

But bluffs are dangerous, and certainly no responsible American official would want to take our deterrence on a bluff. Since deterrence is in the mind, we want to leave no room in the minds of the men in the Kremlin for speculation about a low-risk first strike on us. We need a deterrent force that we can show to the Soviet Union and which will prove to them, on their own calculations, that their attack would carry an unacceptably high risk of a devastating retaliation.

We hedge against loss of our deterrent by protecting our retaliatory forces. We hide them under the seas—the Polaris approach—protect them in hardened silos—the present Minuteman solution—put them on a recallable alert—our bombers—or we can provide extra protection in the form of a ballistic missile defense. Each of these protections has its own special function and special value. Each has its limitations if used alone.

The limitation of alert bombers is that they must have some minutes to take off or they can be destroyed on their soft bases. The limitation on any feasible Minuteman hardening is that at some point enemy accuracy can overcome it. The limitation on Polaris concealment lies in the degree of effort an enemy is willing to make to

find and destroy the submarines. By combining various kinds of protection and various kinds of weapons, however, we are able today to compensate for the limitations and provide in sufficient measure the necessary hedges against undue wartime erosion of our forces.

CONTINUOUS REVIEW OF SOVIET NUCLEAR FORCES

There must be continuous review of the growing Soviet nuclear forces and continuing efforts to insure that our deterrent cannot be eroded. This was a concern of the past administration. It was my concern when I started my review of our strategic nuclear posture. In the course of my review, several new developments were brought under intense scrutiny. Some of these developments had not yet become priority problems in the last administration. These included the still growing Soviet SS–9 ICBM force and the Soviet production rate of Polaris-type submarines.

The SS–9 is large and accurate. The Soviets have installed more than 200 and are building sites for more. In small numbers, the SS–9 might be regarded as no special threat, but my own study indicated that we could have problems with large numbers.

The accuracy and size of the SS–9 make it ideally suited to take out some of our Minutemen. The numbers of SS–9s which we now anticipate could make inroads on our Minuteman. It was the further combination of numbers, accuracy and multiple warheads that caused me to question future Soviet capabilities against Minuteman.

The Soviets are testing multiple warheads on the SS–9.

WHO PARTICIPATED IN DEFENSE DEPARTMENT REVIEW

Senator FULBRIGHT. Mr. Secretary, when was this review made that you refer to here?

Mr. PACKARD. When I went to work starting the 20th, shortly after the 20th of January, the last 2 months, Mr. Chairman.

Senator FULBRIGHT. You participated in it. Did any of the people who were in the previous administration participate in it or did you do it alone?

Mr. PACKARD. I undertook the investigation using the resources in the Defense Department, but it was my responsibility to conduct the investigation, Senator Fulbright

Senator FULBRIGHT. Were any of the participants people who were in the Johnson administration?

Mr. PACKARD. There was no participation by the previous Secretary of Defense or Deputy Secretary but some of the Assistant Secretaries who had been studying this problem participated; yes. The Secretary of the Army. The Chiefs of Staff and others also participated.

Senator FULBRIGHT. Well who, for example? Was Mr. Foster one of them?

Mr. PACKARD. Mr. Foster participated.

Senator FULBRIGHT. Did any of the science advisers of the previous administration participate in it? It is very odd to me that all of a sudden there is such a change. It would be very well to clarify the record by saying who did this study that you referred to.

Mr. PACKARD. Senator Fulbright, if you will allow me to continue the statement, I will be glad to discuss the details with you as long as you may wish.

Senator FULBRIGHT. I thought it would make it much clearer to know who participated in the study. It has been a mystery to me, as it was in the last hearing, as to why there was such a sudden change within a very brief period from one concept of the ABM to another considerably different one. There ought to be some explanation of this.

Mr. PACKARD. Senator, I will try to give you that explanation today if you will allow me to continue.

Senator FULBRIGHT. It is very important to me who did it. It is always very important to know.

Mr. PACKARD. I will be glad to discuss this matter with you.

Senator GORE. We have the same Joint Chiefs of Staff, but they seem to have changed their position. A year ago they were saying that it was absolutely necessary for the security of the country to protect the people of the cities.

Senator FULBRIGHT. Three months ago.

Senator GORE. In fact, about 3 months ago. They changed their view within a matter of days, so I believe it was plan B that was finally adopted. But anyway we will hear your statement.

Mr. PACKARD. Mr. Chairman, I will be glad to discuss these matters as thoroughly as I can with you here today.

GROWING THREAT TO OUR DETERRENTS

The Soviets are testing multiple warheads on the SS–9. And if they give the SS–9 three individually guided warheads with high accuracy and high yields—which they are fully capable of doing—then they triple their threat to Minuteman and remove our confidence that that portion of our deterrent can survive in adequate numbers This is a danger which we cannot ignore.

The growing threat to our bombers is a simple matter of numbers and time. If large numbers of Soviet submarine-carried missiles are stationed close to our shores, their short flight time to bomber bases can reduce the takeoff time available to the planes. Thus, fewer bombers can be expected to get off the ground if the Soviet Union continues to expand its Polaris-type force.

Our own Polaris program offers us the least vulnerable deterrent weapon now and in the foreseeable future. I am greatly impressed by the capabilities of the ships and the magnificent men who sail them. During my studies, however, I saw clear efforts on the part of the Soviets to find ways to counter the Polaris. I believe that our Navy will keep ahead of the Soviets, but I want to remind you that we should never depend on any single weapon system for our deterrent.

Now, I want to repeat that our deterrent forces and their protection are clearly adequate today. If the Soviets modify some of their current buildup trends or reach an arms control agreement with us, then the deterrent threat will remain good for the indefinite future. But our newest and best analyses of these complex problems convince us that we must provide further hedges against possible unacceptable erosion of our deterrent in the future.

METHODS FOR PROVIDING MORE PROTECTION

What are the possible methods of providing more protection?

We could remove the potential vulnerability of the Minuteman by planning to beat the SS–9 to the punch, but since we cannot accept the risks of launch-on-warning—the doomsday machine approach—we either must provide more hardening or add missiles or provide a ballistic missile defense. Extra hardening is useful up to certain levels of enemy accuracy, and we are planning some superhard silos, But with sufficient accuracy a large number of SS–9s could overcome the hardening which we can achieve. Extra missiles could stimulate the arms race. A ballistic missile defense could provide the necessary hedge. Even protection at two sites, as provided in phase I of the Safeguard program, could help maintain the necessary percentage of surviving Minuteman against the SS–9 threat we now expect.

We can hedge against bomber attrition by hardening the planes and bases, though it would cost a great deal. It would be better simply to maintain the necessary takeoff time. The Safeguard program in phase II would help ensure adequate time by intercepting at least the first incoming warheads.

This examination of various kinds of protection and the strengths and limitations of each is what convinces us that we cannot put all of our deterrent eggs into one deterrent basket. In my judgment, no one type of force, not the Polaris nor the Minuteman, nor the bombers, can be provided with enough guaranteed protection for the indefinite future so that it can provide us the guaranteed retaliatory destruction that we need. A variety of forces is needed; a variety of protections for those forces is needed. That is why we need a ballistic missile defense for our Minuteman and bombers.

ENCOURAGEMENT TO SOVIETS TO NEGOTIATE

If we provide this particular means of defense we gain an added advantage. We encourage the Soviets to move toward workable arms control agreements. The Safeguard deployment away from cities shows the Soviets that we are not trying to gain a first strike capability against them. Our cities, while they can be protected effectively from a small-Chinese-type attack, cannot be and will not be protected from a heavy Soviet attack. The Safeguard deployment, therefore, shows the Soviet Union that we are not planning to attack them and that they can reasonably negotiate arms control agreements that protect deterrence while giving up offensive, first-strike use of long-range nuclear weapons.

Safeguard gives the Soviets another incentive to negotiate. It shows them that any effort on their part to achieve a successful first strike is fruitless—that we will protect our retaliatory forces now and in the future and do it effectively. Safeguard, as it relates to the Soviet Union, helps deprive them of any first-strike capability but without threatening their second-strike deterrence.

This is an important point, because the original Sentinel deployment could well have convinced the Soviets, mistakenly, that we were trying to deprive them of their deterrent. The Sentinel was to be deployed around cities, even though it was clear to us that it could not protect the cities against a heavy Soviet attack. Put bluntly, the original Sentinel could have led to the same reaction that the Soviets

caused in deploying their ballistic missile defenses. The first effort at a Soviet ABM was at Leningrad and Moscow some years ago. Next, they installed an ABM system around Moscow, and covered the populated, industrial areas in western Soviet Union with a system which, it its early stages, looked like an ABM. From this pattern, American planners concluded that the Soviets could be attempting to protect their cities from our deterrent threat. They could be trying to deprive that threat of its credibility. This we could not permit. We had a proper counter to the Soviet moves and possible intentions for we were developing multiple guided warheads that could be installed on strategic missiles. We are continuing to develop this weapon. But if the Soviet Union had deployed its ABM around its second-strike forces, its missile sites, we would not have had to react. Or, if arms control talks had convinced us that the Soviets were attempting only a light defense against a Chinese attack, our hedge against their city protection could become the subject of proper negotiations. It is clear, therefore, that the Safeguard protection of Minuteman and bomber bases and light protection of population requires no military response from the Soviets and actually encourages them to sit down and talk arms control.

SAFEGUARD PROVIDES HEDGE AGAINST FAILURE OF ARMS CONTROL

Safeguard has another virtue which I want to mention now before turning to the description of that system. It provides a hedge against failure of arms control. If the Soviets refuse a workable agreement, then this country will be able to move to a protection of its second-strike force, if the Soviets continue to install more effective weapons. Without phase I of Safeguard we would have no effective option to defend Minuteman in the time that might be required if arms control talks failed.

Gentlemen, where the security and even the survival of our Nation is involved, it is my responsibility to recommend courses of action which are adequate and which are the least costly available to us. In my opinion, the first phase of the Safeguard program and the options of phases II and III are the very least that I can recommend to do this job.

I approached my study of this program by looking at the technical capabilities of the components available, the state of their development and the likelihood that they can do what will be required of them. I reviewed the issues of deterrence and the problem of phasing the protection with the development of the threat. The charts which I have here summarize this analysis, and I would like to go through these charts with you at this time.

Senator GORE. Thank you, Mr. Secretary. We shall be very pleased to review the charts with you.

Would you mind using the portable microphone so that the audience may hear?

SUMMARY OF STUDY

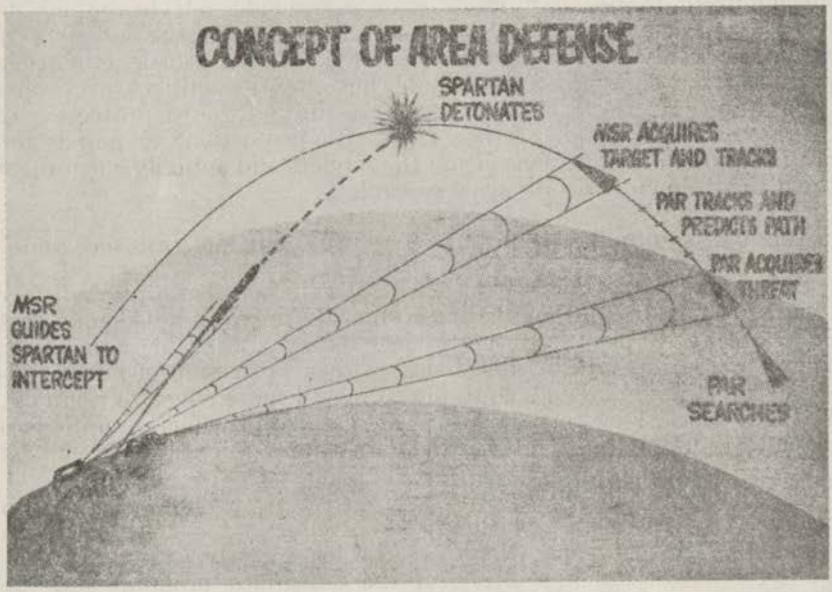
Mr. PACKARD. Mr. Chairman, and gentlemen, this is a summary of the study we have made. We reviewed the area and terminal defense concepts, and I want to go over those briefly so that you understand them in principle. I would also like to go over them because there are some points of interest here.

I want to talk about the components and their state of development. We have some further points here on the threat as it was seen in 1967 and as it is seen now, about the deployment alternatives that we considered, about this modified deployment, what we are now calling the Safeguard system. Then we want to show you specifically what we propose in phase I, and what can follow in other phases in response to other changes in the threat.

Senator GORE. These are the six charts then?

Mr. PACKARD. We have more than one chart on some of these points, Mr. Chairman.

CONCEPT OF AN AREA DEFENSE



The concept of an area defense involves the use of the PAR, the perimeter acquisition radar, which is the long-range radar. This radar has the capability to detect an incoming target at a range of well in excess of 1,000 miles. It is limited by the horizon and the height at which the incoming target can be intercepted.

This radar has some very important capabilities which I will talk a bit about when I come to the description of the PAR itself.

The information from the PAR is fed into a computer and to the missile site radar which is used to pick up the threat as it approaches closer to the point of impact. The missile site radar guides the Spartan to the intercept high above the atmosphere, at a range that is several hundred miles away from the projected point of impact.

SIGHTING LIMITATION OF RADAR

Senator GORE. Might I ask what is the distance from the site of the radar to the point of pickup? Must a missile emerge over the horizon before it is picked up?

Mr. PACKARD. Yes, Mr. Chairman, it must rise over the horizon, so the distance at which the radar will pick up the target depends upon the height of the target at the time, and the capability of the radar also. Its range is in excess of 1,000 miles.

Senator GORE. Is your limiting factor purely the curvature of the earth? Could the radar work at greater distances except for the curvature of the earth?

Mr. PACKARD. The radar is also limited as to how far it can see, so that if a missile were much farther off, even though it got up high enough, the radar would not have the capability of obtaining enough information from the incoming target to provide tracking and the necessary control for the system. But the capability is well in excess of 1,000 miles, and in closed session I would be glad to give you more detail.

Senator GORE. Thank you.

DISTINGUISHING CAPABILITY OF RADAR

Senator FULBRIGHT. May I ask before we go on, can a radar distinguish between a true missile and an airplane or another object of similar size?

Mr. PACKARD. One of the important capabilities of the PAR radar, and I will go into this a little further, Senator Fulbright, is that it has quite a good capability of distinguishing between missiles and other types of objects. That is one of the reasons why it is necessary to have a rather large and complex radar for this purpose. I'll talk about that a little later.

Senator FULBRIGHT. Can it tell whether the warhead is a true warhead or a dummy warhead in a missile? Can it analyze what is inside of a missile?

Mr. PACKARD. Senator Fulbright, it obviously cannot analyze what is inside of it but there are——

Senator FULBRIGHT. I don't know that it is so obvious. To me it is not obvious.

Mr. PACKARD. There are what we call indicators that can be used. The PAR radar has a great deal of capability to discriminate between warheads, and other objects—chaff, as they call it. It has a good deal of capability to do that.

Senator CASE. Mr. Secretary, before you leave the PAR, is there one PAR at each of these missile sites?

Mr. PACKARD. There is one PAR and one MSR at each of the two sites included in phase I. Some of the other sites would have only the missile site radar. I will show you the precise deployment in the charts later.

Senator CASE. My point is, there is only one of each of these radars at each of the missile sites?

Mr. PACKARD. Yes, Senator.

Senator CASE. So in phase I there would be one for one missile site and one for the other, and that is it?

Mr. PACKARD. Yes.

Senator FULBRIGHT. Could a PAR be stationed on Guam or some way off station and coordinated with a missile site in North Dakota?

Mr. PACKARD. It is technically feasible but it would be a very difficult problem, Senator Fulbright. You need a good communication

channel between the PAR and the other components of the system, and to attempt to do that over a distance that great would create very difficult technical problems.

REACTING TIME OF SYSTEM

Senator CHURCH. Mr. Secretary, if the missile were coming in at a rate of about, what speed, 18,000 miles an hour?

Mr. PACKARD. It is on that order——

Senator CHURCH. Something of that range.

Mr. PACKARD. It is on the order of about 4 miles a second.

Senator CHURCH. And the radar picks it up at 1,000 miles, how much time does that then give the system to react?

Mr. PACKARD. The time remaining after radar picks up the incoming missile will be about 15 to 20 minutes, something in that order of magnitude, depending upon the point of interception. [The sentence was later amended by the Department of Defense to read as follows: "Intercept time would be less than 10 minutes."]

Now, one of the questions which has been raised, and it is a very important question, concerns the effect of the explosion of the Spartan warhead. I am sure you know that the Spartan has a rather large thermonuclear warhead. This is used in order to provide the capability of destroying the incoming missiles over a rather large area. The Spartan does not have to hit the incoming warhead to destroy it.

DIAMETER OF MISSILE DESTRUCTION

Senator GORE. Can you give us any information about the diameter of missile destruction, or is that too classified?

Mr. PACKARD. That is classified, Senator.

The intercept is at a very high altitude. Tests and evaluations have actually been made, and all believe there will be no significant effects on either people or property from the explosion of the Spartan warhead in a normal intercept operation. In fact, safeguards are provided in the system so that the warhead cannot detonate at lower altitudes.

Senator GORE. What do you mean in its normal operation? What would be normal?

Mr. PACKARD. If for any reason any one of these Spartan missiles does not proceed to an appropriate altitude for an intercept, there are safeguards in the system that will prevent it from going off, and in fact it would go into a self-destruct situation. It is very important in any weapons system like this to be sure that in case of possible failures of any kind there is no danger and those safeguards are provided in this system.

DESTRUCT CAPABILITY IN AN ACCIDENTAL FIRING

Senator GORE. Does the Minuteman have a similar destruct capability in case of an accidental firing, launching?

Mr. PACKARD. It has—the most important thing about all of these weapons is that you have to provide a continuing command to keep them going, and if they don't get the command then they won't continue. That is the safe protection that is used.

[Subsequently, the Department of Defense amended Mr. Packard's answer to read as follows:

["The most important thing about all of these defensive weapons is that you have to provide continuing command to keep them going, and if they don't get the command then they won't continue. That is the safeguard which is provided."]

Senator GORE. I hope you don't mind these interruptions because you have given a very informative presentation, but Senator Symington brought up a point the other day.

LAUNCHING MINUTEMAN AS A SECOND STRIKE WEAPON

If the Minuteman has the capability which you ascribe to it, Senator Symington suggested one possibility, in the case of detection of an incoming missile or something thought to be an incoming missile or group of missiles, that the Minuteman could be launched the same as an ABM, and that if it were discovered that an error had been made, then the Minutemen themselves could be, as you described it, not continued on their mission. Would you address your remarks to that?

Mr. PACKARD. I am familiar with the comment that Senator Symington made, and if I understand it correctly, it is to use the Minuteman itself instead of the Spartan as the intercept weapon.

Senator SYMINGTON. No. If the Chairman would yield. I can understand why it might not work against an incoming ICBM, but if you want real deterrence, and because of my apprehension about whether this ABM system will work, why not have any possible enemy know that, if they plan a mass attack, and if there is one, it would be mass—that the Minutemen themselves would go off, instead of just trying to intercept the enemy ICBM with the Spartan or the Sprint.

If you do that you would have real deterrence. Instead of two, possibly three, nuclear explosions over this country, there would be one—their nuclear explosion over an empty silo and one of our nuclear explosions in retaliation, the second-strike, over their city. This of course multiplied. That was the thought that I was trying to present.

Mr. PACKARD. Senator Symington, I understand your point and I think you get into these same questions that we talked about in relation to the automatic release of all of the Minuteman. It is possible that you could stop them before they got to their targets, but then you would find yourself in the position of having no Minuteman whatsoever. This would not provide the flexibility that I think the President would like to have under these circumstances.

TIME IN SIGHTING ENEMY MISSILE

Senator CHURCH. Mr. Chairman, may I just go back once again to my question. My mathematics may be wrong, Mr. Secretary, but I don't quite understand your answer to my previous question. If the range of the radar does not exceed 1,000 miles so that the enemy missile cannot be identified by the radar until it is within 1,000 miles of the radar site, and if the enemy missile is approaching at the rate of 18,000 miles per hour, how is it that we would have a reaction time of from 15 to 20 minutes? I don't understand the mathematics.

Mr. PACKARD. Well, sir, Senator Church, that 18,000 miles an hour is not necessarily the right figure. If you would like to have the exact calculations on the intercept times, I would be glad to make them available for you.

Senator GORE. Well, Mr. Secretary, you give us the rate of speed, 4 miles per second. Calculated at 1,000 miles, that would be about 4 minutes.

Senator CHURCH. Yes; I get something like 4 minutes instead of 15 or 20.

Mr. PACKARD. Would you let me put on the Spartan——

Senator FULBRIGHT. Before you leave that, if the incoming missile goes 18,000 miles an hour, how fast does the Spartan go?

Mr. PACKARD. That again, Senator Fulbright, is a classified figure. I will be glad to give it to you.

Could I have the previous chart? (p. 264) I think I can give the answer to Senator Church. This is the straight line of sight to the detection to this point and the incoming missile makes a large arc, so the simple calculations you have made does not give you the time of arrival.

Senator GORE. That is right. I see that.

Mr. PACKARD. You see, the radar picks it up here, but then the missile has to go a long way around to get there.

Senator GORE. So the assumption in my hypothetical case the other day with Secretary Laird of approximately 10 minutes is nearer to what the situation is.

Mr. PACKARD. I think so. Something less than 10 minutes. If you would like to have the exact figures, I would be glad to see that you get them.

Senator CHURCH. Yes.

Mr. PACKARD. Let's go on to the next point.

Senator FULBRIGHT. Don't you think the Russians know how fast those missiles go? Why are they classified for our benefit?

Mr. PACKARD. Well, Senator Fulbright, we have some concern about security, but one of the things I hope to do is to provide the American people with more information about these problems. That is what I did already in this presentation. I am very sympathetic to your view.

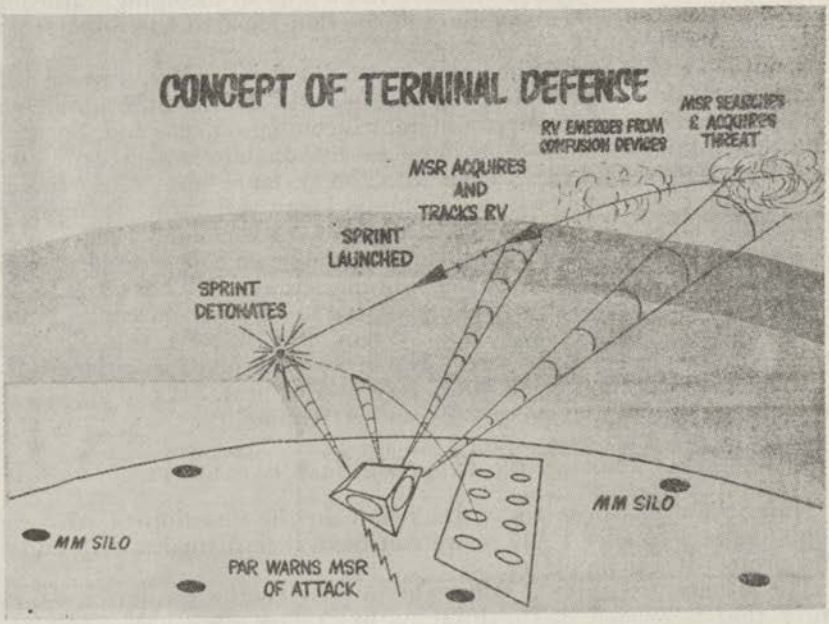
Senator GORE. You don't think it would be at all inimical to our security if we knew how fast they would go?

Mr. PACKARD. That is right, but the precise effective range of the PAR is involved.

AREA DEFENSE

Mr. PACKARD. Now, the other concept is one of terminal defense. But first, let me go back just a minute and say a word about area defense. You see that the range of this Spartan missile is out to several hundred miles, 300 or 400 miles. This provides a large circle—it is really an oval, because you have to take into account the fact that the missiles are coming in at an angle giving a kind of an egg-shaped pattern—but this gives you a rather large area defense, where the incoming warhead can be intercepted even though it may be targeted to anyone of a number of different points. This is what we call an area defense. It involves the interception of the incoming warhead by the Spartan high above the atmosphere, and this provides a very large area of coverage.

CONCEPT OF TERMINAL DEFENSE



Now, the terminal defense uses the same missile site radar, but a different missile, one that is called the Sprint. This is a very fast weapon, and the intercept in this case occurs after the incoming warhead has come down into the atmosphere. It has been tracked by the missile site radar into the atmosphere, and is coming in close to the target. It is necessary, therefore, that the Sprint have the capability of getting up from a standing start to an intercept position in a very, very short time. This is a very impressive capability, so that if the intercept is not made by the Spartan for any reason, we have the backup capability of the Sprint, located close to the point of impact.

Senator FULBRIGHT. How close?

Mr. PACKARD. The range of the Sprint is in the tens of miles instead of hundred of miles—20, 30 miles, something like that.

The perimeter acquisition radar is a large device. It is in a building 200 feet square and 130 feet high. It has a detection range, as I have said, much greater than 1,000 miles. I don't want to give you the precise figure in a public hearing, but I can give it to you on a classified basis if you would like to have it.

Senator FULBRIGHT. What do they cost?

Mr. PACKARD. Oh, they cost about $150 million. Well, that depends also on whether you have one or more faces on the radar.

Now, the important thing about the perimeter acquisition radar is that it has to have this long detection range and it also has to have the capability to do something more than just detect any incoming object. It has to have the capability to provide some discrimination and to track a number of incoming objects at the same time, because if this

system could handle only one weapon at a time, it wouldn't be very good. It has to be able to detect and track a lot of incoming warheads at the same time, and relay the information back to the missile site radar.

Senator FULBRIGHT. When you say a lot, how many, two or 10?

Mr. PACKARD. The PAR itself can provide enough information to handle as many as a hundred different incoming objects and, Senator Fulbright, this depends to a large extent on how much computer capability you would like to put into the system.

This radar uses what we call a phased array technique. It actually involves a large number, several thousand, rather small radars over the face of the radar structure itself, and the beam is swept electronically. You are all familiar with the old radars that move back and forth mechanically. With that sort of a radar you could not possibly obtain enough information to handle a system like this. So this PAR is swept electronically, it can sweep the beam back and forth thousands of times a second, and it has got a very narrow beam. It can give good resolution, and that is a very important capability.

PAR PROTECTION AND TECHNICAL CAPABILITY

Now, there has been some discussion on the question of why we don't make a smaller PAR so we can have it hardened a little more and protect it a little better.

The situation is this—if you want to provide the resolution capability that is needed in the PAR, it has to be a very large device. This is determined by the number of wavelengths in the face, its head, under consideration. So it is important to provide the appropriate balance between this very crucial technical capability that is necessary for the PAR, and the desirability of having this PAR able to withstand some level of attack.

We are in the process of testing the components that go into the PAR, and they are being tested under radiation conditions. The system will have considerable capability to withstand a nuclear attack, but it will not be as hard as a Minuteman in a hardened silo. But this question of striking a balance between protection with hardening and the technical capability that is needed to make the system work has been, in my view, quite appropriately taken into consideration.

STATUS OF PAR DEVELOPMENT

Now, there is one thing about this radar that I think you should know, because there has been some concern about the status of the development. The first PAR radar will be assembled and tested on an operational site.

Senator FULBRIGHT. You haven't tested one?

Mr. PACKARD. We have not tested a complete PAR in the configuration that will be used.

Senator FULBRIGHT. How can you be so sure that it will work?

Mr. PACKARD. Well, I have been dealing with these kinds of things for a long time and I am quite confident that the status of this development is entirely accurate.

Senator GORE. A lot of people were confident about the McNamara line, too. We spend $1,650 million and saved nobody, lost lots of lives. It is now abandoned.

Mr. PACKARD. Let me tell you, Mr. Chairman, what the status of the PAR is. As I have said it involves a number of individual radars and the phasing of those radars to provide this capability. Those components have been set up, and they are entirely satisfactory in terms of the tests so far.

Now, radars of this kind have been put together and, in fact, the missile site radar has similar kinds of characteristics. A missile site radar has been installed at Kwajalein and it is operating in a satisfactory manner.

I have no concern at all about this plan to build the first unit at an operational site. I think there is no risk whatsoever in terms of the engineering problem itself.

The missile site radar is similar. It does not have to have as large faces as the PAR because it is a shorter range device.

It can be hardened a little bit better. It can be put underground, partially underground, and it does not require such a large installation, the building being a hundred feet square, and 40 feet above ground. A prototype unit has been installed at the Kwajalein test area, and satisfactory operation has been achieved from this system. I have no concern about the capability of this particular device to do the job for which it is intended.

The MSR also has to be capable of high resolution, to be able to provide the necessary differentiation between different kinds of objects. It has to have the capability of handling both a large number of targets coming in and a number of missiles going out to intercept. So these radars are a very important element in the system.

CAPACITY OF RADAR TO RESIST ATTACK

Senator SYMINGTON. Mr. Secretary, would you describe the relative capacity to resist attack of the radar as against the capacity of the missile itself?

Mr. PACKARD. Senator Symington, I can't give you the absolute figure——

Senator SYMINGTON. The premise of my question is, if they knock the radar out, they knock everything out.

Mr. PACKARD. I can tell you this, as I have already said, that neither of the radars is hardened to the same extent as the Minuteman in its hardened silo. I will be glad to talk about that problem later.

SPARTAN MISSILE

Now, the Spartan is the missile used in the area defense concept, which intercepts out several hundred miles, is an extension of some earlier developments. As I am sure you Senators who have been here a number of years know there has been a long period of development work on missiles designed to provide protection against ICBMs.

Flight tests are in progress at Kwajalein, and they have been very successful so far. This missile will have a large thermonuclear warhead, and some tests have been made on the development of this warhead. Further tests will be necessary to complete the development of the warhead for the Spartan. These tests can be conducted in the underground testing program, so that it will not be necessary to conduct any atmospheric testing in order to check out this warhead.

SPRINT MISSILE

The Sprint missile is a very impressive development. I hope that some time you will have a chance to see the performance of these Sprints because they have to start from the ground and get to an incoming warhead when the warhead is getting pretty close, and going very fast.

Flight tests have been very successful and the performance of the Sprint looks to be entirely satisfactory.

SPRINT MISSILE INTERCEPT OVER BALTIMORE

Senator GORE. Could I ask you a question about it? I was talking with a very eminent scientist—literally hundreds of them have volunteered their assistance in this matter, which I appreciate—and I asked him to describe what might happen in case a Sprint defense was set up near Washington, and if a missile was detected in trajectory toward Washington, which trajectory would be a route over Baltimore, and a Sprint was sent up to meet it, where would it meet it? He calculated, I believe, that the incoming missile would be at 23 degrees. I won't try to confuse the hypothesis by giving his calculations, but he undertook to say that the interception would be approximately over Baltimore.

So I said "Well, suppose that the incoming missile, whether fired by accident from a Russian submarine or our own submarine, suppose it had a proximity fuze," that is the kind of mechanism that would detonate if a Sprint approached it at a certain proximity, I said, "What would happen to Baltimore?" And he said if it were a clear day the city would be incinerated.

Would you mind commenting on that possibility?

Mr. PACKARD. Well, that is speculation, Mr. Chairman. It would depend upon the size of the incoming enemy warhead.

First, let's get one thing straight: The size of the warhead in the Sprint is such that at the intercept point this warhead would not cause any damage on the ground.

Senator GORE. I was not speaking of the damage from Sprint. I was speaking of an incoming missile with a proximity fuze—this is my language—some device that would cause it to explode when an interceptor approached.

Mr. PACKARD. Mr. Chairman, this is, I think, an indication that there are ways to try to counter all of these defensive systems. But one of the important things about this system is that we have this area defense capability, and we have the opportunity to intercept a missile—if that were the enemy's intent—with the Spartan, and at that altitude there would be no difficulty whatsoever. And I think the other answer to that question is that if an enemy missile gets through, whether it detonates at a high altitude or on the ground there is a great deal of trouble. The name of this game is not to figure out what happens in those kinds of instances, but to consider this as a deterrent so we don't get into war.

If you talk about all the possible things that can happen, if we are in a nuclear war, I can think of a lot of them that none of us would like. So the objective of this whole program is to serve as a deterrent.

Senator GORE. Well, I was impressed with the statement that I read of the Canadian Prime Minister, that if the ABM had to be used, the whole system of deterrence would have failed.

Mr. PACKARD. I think that is correct. I think if any of our nuclear weapons ever have to be used, our system of deterrence has failed, and that is why we have to have a variety of weapons and why we can't put all our eggs in one basket.

We are all working together in this job to try to prevent a nuclear war, and if we have one, some terrible things are going to happen, there is no question about that.

Senator SYMINGTON. Just one more question along the lines of what the Chairman has been talking about, Mr. Secretary. If the Soviets decided a target was important enough to saturate, whether it was Washington or Baltimore or Kansas City or St. Louis, that city goes regardless of this ABM, does it not?

Mr. PACKARD. Yes.

Senator SYMINGTON. Thank you.

PROCEEDING ON ARMS CONTROL TALKS

Senator FULBRIGHT. What do you mean when you say we are all working together to prevent a nuclear war? Do you mean only the Pentagon or who?

Mr. PACKARD. Senator Fulbright, our objective in the Pentagon is to provide the kind of deterrence that will assure us that we do not have a nuclear war. I judge that the objective of this committee is to achieve arms control or whatever arrangements might enable us to do the same thing.

Senator FULBRIGHT. Do you include Russia?

Mr. PACKARD. I would hope we can include Russia.

Senator FULBRIGHT. Then why don't we start by talking to them about it right now in accordance with the Nonproliferation Treaty that we just signed instead of building missiles, just test the water, see what their attitude is. They say they are in a mood to talk. I can't understand our reluctance to do it. What is really bothering me more than anything else is the timing of this Safeguard decision, the day after we passed the treaty by a large majority. The Russians were ready to have a meeting with the previous administration in December. There wasn't any preliminary planning necessary; it already had been done. I cannot understand—if you say we are all working for peace including the Russians, and I don't disagree with that—why we do not say "All right, let's start," and if they are mulish and won't go forward then come and talk about the ABM.

Mr. PACKARD. Well, Senator Fulbright, as I have already said, I look at this Safeguard program as a factor that, in my view, will help us move towards discussions with the Russians. It is not my place to decide when the arms control talks are to be undertaken.

Senator FULBRIGHT. That is very significant. If I interpret you correctly, you say "I have a special restricted responsibility in the Defense Department." Whether or not talks are made is really is not your responsibility. That is a good answer, and I accept it if that is what you mean. You don't undertake to make that decision. I don't disagree with what you said. You just said that is not your decision.

Mr. PACKARD. Let me go further, Senator, I think it is our responsibility to help in any way we can.

Senator FULBRIGHT. I liked the way you put it, that we are all working together to prevent a nuclear war. That is what you just said and you include not only yourself and your immediate colleagues but the Senate, the Congress, and the Russians, and other people who have signed the Nonproliferation Treaty, if you like. I think all of them have an interest. If that is true, and you and the Secretary of Defense have already stated that the best way is by arms control, then it leaves me, as you can see, in a great dilemma—why don't we proceed? What is the reluctance about it?

If no plans to confer had been made, I can see why you would need time. But I know, everybody knows, it has been announced that the preceding administration, together with all the people in the Pentagon, including Mr. Foster, had made plans and the previous administration was ready to go to a conference, but the incoming administration felt, and I don't criticize them, but this is merely a statement of fact, that it would be perhaps unwise to proceed then, so it was called off. But President Johnson, as everybody knows was willing and, I think, anxious to have such a conference. Everything was prepared, the Russians were prepared. This is what puzzles me more than anything else, why we don't go on and begin negotiations.

HOW DOES ABM STRENGTHEN CREDIBILITY OF OUR DETERRENT?

Senator CHURCH. Mr. Secretary, before you go on, one thing that puzzles me is your hypothesis that the ABM system will somehow strengthen the credibility of our deterrent. How can you be certain, if we are attempting to develop and deploy a capability to absorb, so to speak, a first strike, that this might instead of increasing the credibility of our deterrent, actually weaken that credibility? If the Russians assume that we are relying upon the defensive system in which they have no confidence, it seems to me that the introduction of an ABM might have precisely the opposite effect even though you intend it to increase the credibility of our deterrent; it might have just the opposite effect.

Mr. PACKARD. Senator Church, I think you can proceed in the opposite direction and say that if we reach a point where our retaliatory force does not have the capability to absorb a first-strike, then our deterrence is indeed gone. I think that is really the problem.

PRESIDENTIAL AUTHORITY INVOLVED IN LAUNCH DECISION

Senator CASE. Mr. Secretary, would you give us some information as to the degree to which each of these missiles operates automatically or must in order to accomplish its purpose. I assume that in the case of the Spartan there will be some time in which the matter may be considered by high authority, whether by the President or not is a matter I would be glad to have your judgment on. But in the case of the Sprint, which is a fast missile, in order for it to be effective is it, or is it not, necessary for it to be completely automatic in its response?

Mr. PACKARD. Well, Senator Case, that is a very good question, one which troubled me when I first began to took into the system. I have very strong views that this is not the kind of a situation in

which you can allow a computer or any automatic device to release a nuclear weapon.

Now, you have to, I think, remember that we have the ability with the PAR to detect the incoming warhead out 10 minutes, depending upon the point of interception.

Now, the President has that time in order to make a decision whether to use the Sprint or not, and I don't——

Senator CASE. Spartan or Sprint?

Mr. PACKARD. Sprint.

You see, if he gives the authority to use the Spartan he would, I presume, also give the authority to use the Sprint. So we are not talking about having to make a decision between the time the warhead hits the atmosphere and the time of impact—that would be impossible. But we have the time after the early interception by the PAR, and in my view, this will provide adequate time to assure command and control by the President.

I am not at all troubled by the fact that the Sprint is a fast reaction device. He will have had time to make the decision before you even get very close to using the Sprint.

Senator CASE. This is a part of your conception of its operation.

Mr. PACKARD. Yes.

DATA PROCESSING INVOLVED

Now, let me say a word about the data processor because this is an important element in the system. The radars, as I have told you, provide a good deal of data on the number of incoming warheads so that predictions can be made.

Predictions are made by feeding the data from the PAR and the MSR into a data processing center which then calculates the point of impact and provides the calculations and guidance for the intercept, whether it be the Spartan missile or the Sprint missile.

This data processing job is a large one. It does not involve any new technology. It is simply a large system involving data processing.

Two data processors are installed and operational at Kwajalein to take the information from the missile site radar and provide the processing and control for the Sprint. So that part of it is being checked out and is working well.

There is always a big software job on these sorts of systems, and one of the things I did was to look into software problems because the availability when needed of the skilled people doing that part of the job is an important factor in the effective operation of the system.

So I have tried as best I could to look into the various aspects of the system's components, and it is my conclusion, after having done this, that the system does have the capability to do the job that we expect it to do.

INSTALLING COMPLETE SYSTEM AT EARLIEST DATE

Now, one of the things that I considered in this study was the possibility of installing a complete system, including the PAR, the MSR, and the missiles out at Kwajalein. Whenever you have a large and complex system it is very desirable, if the time is available, to put it all together and get it checked out before you proceed with the deployment.

To have done this would, however, have added at least 2 years, or possibly more, to the time needed to place the complete system in operation. The plan we are now proposing will have the first two sites operational in early 1974—late 1973 if we accelerate it—but probably early 1974 at best.

If we had proceeded to put in a complete installation and tested it at Kwajalein, it would have delayed the first installation until early 1976. In my view, that was too long a time to take, because if the threat had developed in the interim and we had felt it was necessary to proceed with the system, this approach would not have given the President an appropriate base from which to solve the problem.

Now, the plan that we are recommending, with installations at the two sites in the Minuteman fields, up in the northern part of the country, was developed, in part, so that we can get a complete system together at the earliest possible date and shake it down. Then we will be in a position so that if the President decides that additional deployment is necessary, it will be possible to proceed with that deployment earlier than if we had waited to test the whole system. This is the judgment that we have made, and I think it is a correct judgment. I think that this provides a much better opportunity for the President to use the flexibility that we have designed into the system.

NUCLEAR THREAT IN 1967

Now, I would like to take a few minutes to talk about the threat as it was seen in 1967 and some of the things that we see differently now, since I know this is a question that is on the minds of a good many people.

In 1967 it was estimated that the Chinese would soon be able to deploy an ICBM within a few years. They had not proceeded with an actual test, but there was enough evidence that they were working on such a device.

The evidence on the Soviet ICBM effort indicated that they would level off their force, particularly the SS–9 which I will talk about in a few minutes. At that time, although some work had been done by the Soviets on submarine launched ballistic missiles, there was not sufficient evidence to predict that they were in the process of building up a large submarine launched missile capability.

When I looked at the situation in these studies—we went back and got the available data, and checked to make sure that we had the latest intelligence projections—we concluded that there were some things which had changed.

The first Chinese ICBM had still not been tested; it was still delayed. But two things had happened since 1967. First, as you all know, thermonuclear warheads, several of them, had been tested by the Chinese. These thermonuclear warheads were large enough to be a very serious threat if they could be delivered by an intercontinental missile.

The Chinese had not yet tested an intercontinental missile. In fact, they had only tested some short-range missiles. But they had substantially expanded their missile test facilities.

We looked at the Soviet posture—and I will show you some curves on that in a minute—and found that the Soviet ICBM deployment had continued beyond that predicted in 1967.

[Mr. Packard subsequently showed one chart which appears on page 279.]

They had proceeded with the Polaris-type submarine and had developed a substantial production capability. We analyzed this in terms of the problems that would be involved if the Soviets had a large force of submarine-launched missiles deployed close to our shores. We concluded that this would indeed pose a threat to our bomber retaliatory capability.

SAFEGUARD AS PROTECTION AGAINST SUBMARINE ATTACK

Senator CASE. Mr. Secretary, right there, in your statement you mentioned the Safeguard system as useful for protecting against submarine attack, as well as the protection——

Mr. PACKARD. Yes.

Senator CASE (continuing). Of our missile sites against the Soviet ICBMs. Would you be rather specific about this?

Mr. PACKARD. Yes.

Senator CASE. I thought these things came low.

Mr. PACKARD. Yes.

Senator Case, the missiles that come directly from the Soviet Union come in at a very large arc, and this would provide adequate warning time so that with a readiness program it would be possible to get a substantial portion of our bomber force off the ground.

Now, the Soviets until recently had no real capability of bringing their missile launch point close to our shores. With these submarines they could do so, and this would then mean that the missile would have a short flight time from the submarine to the bomber bases, and in some cases perhaps only as long as five——

Senator CASE. That isn't quite my point, Mr. Secretary. I do understand that, of course. I thought you were suggesting that this proposed Safeguard system had a capability for defending our bombers against submarine attack.

Mr. PACKARD. Not completely.

Senator CASE. You did not mean that?

Mr. PACKARD. No. It would simply allow more of them to get off the ground than would otherwise be the case.

Senator CASE. Would you develop that point?

Mr. PACKARD. Yes. Well, it is again this matter of early warning time, and the ability to intercept the first few incoming missiles, giving the bombers the additional time needed to get off the ground.

Senator CASE. Would there be warning from this system of submarine-launched missiles?

Mr. PACKARD. Yes.

Senator CASE. There would be.

Mr. PACKARD. One of the things that the previous deployment——

Senator CASE. Which radar would provide that?

Mr. PACKARD. I will be glad to show you the details. The previous Sentinel deployment had the PARs located across the northern part of the United States. We have added faces to the radars on the four corners of the country so that they can look out over the ocean and provide surveillance against submarine-launched missiles. That is one of the things we have added to the system.

Senator CASE. No matter how close they may be?

Mr. PACKARD. I think within any reasonable distance. We would hope that the Navy would keep them off the beaches.

Senator CASE. No, but I mean seriously.

Mr. PACKARD. I think, Senator Case, in the time involved this would provide us additional warning which we would not otherwise have, as well as the possibility of intercepting the first salvo of submarine launched missiles. It is our calculation we would thus get more bombers off the ground than would be possible otherwise.

Senator CASE. Of course, that would be true only if the whole system were deployed.

Mr. PACKARD. You are quite correct on that, and I will show you how these various deployments can be made to match the threats; that is one of the aspects of this plan.

Senator CASE. Thank you, Mr. Secretary.

FRACTIONAL ORBIT BOMBARDMENT SYSTEM

Mr. PACKARD. Just a comment about this fractional orbit bombardment system: This involves a technique whereby instead of sending the missiles on a high trajectory above the earth, they are kept down at a lower trajectory where they cannot be detected by radar as far out, giving you less warning. This system has been tested, but we do not yet know the extent of its deployment. In any event, we have a good deal of additional protection for our bombers with an early warning and intercept capability against FOBS.

Senator CASE. Mr. Secretary, just for everybody's information and refreshing my own recollection, just how does this fractional orbit bombardment system work? Would you explain in popular language what it is?

Mr. PACKARD. I will do the best I can, Senator Case.

The ballistic trajectory of a missile is one in which it is shot up sort of like an artillery projectile, the energy drives it up through the initial stage and then it goes up very high and comes down at the intended point of impact.

In the fractional orbit system you don't send it up high—it is sort of like a satellite orbiting, only at a very low level orbit. So the missile goes up to a lower altitude, and then instead of taking this big arc it just levels off parallel to the surface of the earth and goes through part of an orbit until it is retro rocketed down to its target. This makes it possible, for one thing, for the Soviets to send a missile around the South Pole instead of coming in from the North. They have actually flown these FOBs, and this provides an additional uncertainty in the problem of protecting our retaliatory capability.

Senator SYMINGTON. Because of troubles over the poles they haven't actually deployed it yet, have they?

Mr. PACKARD. No, you are quite correct, Senator Symington. They have run tests but, we don't know whether they have actually deployed this as an operational weapons system.

Senator SYMINGTON. Thank you, Mr. Secretary.

BETTER CHANCE OF ARMS NEGOTIATIONS NOW

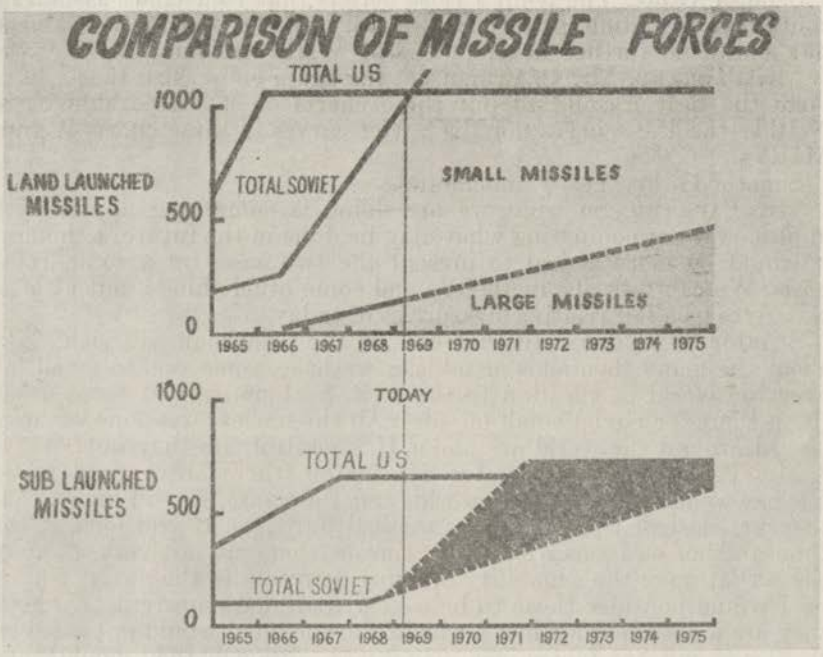
Senator CASE. Mr. Chairman, may I just ask one more question before we get away from the changes in 1967? It is fair, isn't it, to say that in addition to these changes that you have pointed out, there

also is a better chance now of negotiated arms reduction than there was at that time, and in part because of these capabilities that are suggested on the other side. Is that a fair statement?

Mr. PACKARD. Senator Case, I think that is a fair statement and I will show you on these charts how that comes about. I think that is indeed a very important factor.

Senator CASE. Thank you.

FURTHER U.S. DEVELOPMENT NOT INDICATED IN CHARTS



Senator GORE. Mr. Secretary, this particular chart is one that gave me the idea to make some amateur efforts at a chart myself. You proceed on the assumption here that the United States will cease further development. The chart you are using levels off completely in 1968 for the total of the United States while the Soviet projections continue upward.

Now, it is all right to take that assumption, but unless we take into consideration the full facts it could be misleading, and I am sure you don't intend it to be so. Would you address your remarks to this.

Mr. PACKARD. Are you speaking of MIRV?

Senator GORE. Yes.

Mr. PACKARD. Yes.

Well, Senator Gore, these charts do not include calculations on MIRV. At the present time MIRV is still in development and has not been deployed and will not be deployed for some time. So I felt it was appropriate to project the forces on these charts without MIRVs. Neither the Soviets nor our forces shown on the charts include MIRVs, so they are at least on a comparable basis.

Senator GORE. There is no doubt in your mind that the Polaris missiles are going to be replaced by Poseidon, is there?

Mr. PACKARD. Mr. Chairman, they have not been replaced yet, and again let me say——

Senator GORE. That doesn't answer the question though, Mr. Secretary. Do you have any doubt that it is our intention to replace the Polaris with the Poseidon?

Mr. PACKARD. It is our intention, Mr. Chairman, unless we conclude some agreements that would dictate otherwise.

Senator GORE. The point I raise here is that your chart assumes a continued escalation of nuclear weaponry on the part of the Soviets, but shows no further development of MIRV on our part.

Mr. PACKARD. Mr. Chairman, let me again emphasize that I have done the best I could to put these charts on a comparable basis. Neither the U.S. curves nor the Soviet curves in these charts include MIRVs.

Senator GORE. Yes, I understand.

Mr. PACKARD. So what we are doing is comparing apples with apples, and not comparing what may be done in the future. I thought it would be more logical to present the two cases on a comparable basis. We can talk about MIRVs and some other things, but at least this gives us a fair relative measure as of today.

Senator SYMINGTON. In that case, if the Chairman will yield, how about the many thousands of missiles we have, some not so small, all over the world in addition to the ICBMs. I notice you have a big jump there for Soviet small missiles. All the nuclear weapons we have placed around the world are under U.S. control, are they not?

Mr. PACKARD. Yes. Senator Symington, there are a good many nuclear weapons around the world, and I am sure, as you know, that they are designed primarily for tactical purposes. If you look at the thousands of weapons we have in Europe there are not very many of them that have the capability of being delivered to the Soviet Union. So I would consider those to be a very marginal deterrent. We hope they are a deterrent against a war in Europe but I would not consider them a significant factor in a global war, although they would have an impact.

Senator SYMINGTON. Many are tactical, but many are not.

Senator FULBRIGHT. What is the small missile the Soviets have, IRBM?

Mr. PACKARD. The Soviets have IRBMs so if you want to consider the situation in Europe you would have——

Senator SYMINGTON. You have a tremendous jump of small Soviet missiles on the chart.

Mr. PACKARD. Let me go through the chart and I will do the best I can to explain it.

These are the land-launched missiles. The blue curve here is essentially our Minuteman force that was building up in 1965 and is now at the 1,000 level.

The Soviet buildup—they had a few missiles down here and I haven't attempted to show the detail—but the main segment, the yellow segment here involves a missile they have deployed which in general terms is very comparable to out Minuteman. It is a liquid-fuel missile and has about the same size warhead, as the Minuteman.

I would think that for purposes of our discussion we could consider what I call small missiles, as comparable to the Minuteman.

The large missiles——

Senator SYMINGTON. The large missile then is the SS–9?

Mr. PACKARD. The large missile is the SS–9.

Senator SYMINGTON. The small missile is a large megaton missile, but not as large as the other. I see. Thank you.

Mr. PACKARD. It is not as small as those tactical missiles we were talking about.

NUMBER OF SUBMARINES ON STATION

Senator CASE. One point if I may, on the sub-launched missiles. The Secretary earlier this week said that not all of our submarines could be counted on as being on station and therefore useful at all times. He was asked to what extent our submarine capability was degraded by that fact and he refused on security grounds to give an answer. Yet in the newspaper it was stated that out of the 41 submarines 30 could be counted on as being on station. I can't understand how a columnist can get information that the Senate cannot get.

Would you give me a little explanation?

Mr. PACKARD. Senator Case, I can say that I have been here only 2 months and I have been confused by that matter myself.

Senator CASE. Does this chart take into account the average or the dependable number on station at all times or is it just a maximum and theoretical figure?

Mr. PACKARD. This is up in the 600 range so this does not take into account the percentage that are not on station, but here again we have tried to project the Soviet force on a comparable basis. Those not on station are not a large fraction of the total. They are the ones that have to be brought in for servicing, for change of crews and those sorts of things. So you keep a rather large fraction of your total submarine capability available although it will vary from time to time.

Senator CASE. Thirty would be a very conservative figure would it not?

Mr. PACKARD. I would think so under normal conditions.

MINUTEMAN—A SMALL MISSILE

Senator FULBRIGHT. Mr. Secretary, one other matter concerning these small missiles. I am at least confused by the semantics. If I understand it, you say the Minuteman is a small missile. The Minuteman, if I am correctly informed, is 50 times as powerful as the bomb that destroyed Nagasaki, is that correct? And you call it a small missile.

Is my understanding correct?

Mr. PACKARD. I call it a small missile in order to differentiate it on this chart. I would not call it a small missile otherwise.

Senator FULBRIGHT. Don't you think it is a little misleading, a bomb which is 50 times as powerful as the one that destroyed Nagasaki is considered small just as a matter of semantics. It might confuse the layman. It did me. I thought you meant a little thing, you know, like a hand grenade or something. [Laughter.]

A small missile that can destroy all of Washington doesn't seem to me to be small. Fifty times as large as the bomb on Hiroshima which was 20 kilotons if I remember correctly and a megaton would be 50 times as large, wouldn't it? Do I add correctly?

Mr. PACKARD. That is right.

Senator FULBRIGHT. And you call that small. This is what bothers us a little. It is like the speculation of our scientists who say, "Well, it will only kill 50 million Americans, so it is small." Do you see why it bothers us sometimes?

Mr. PACKARD. Senator Fulbright, I will be very happy to change this terminology if you think this would be more understandable. On this chart I did this so we can differentiate between the smaller missiles and the larger missiles for the purpose of talking about developing a force.

Now, there are some interesting things, I think, that we should look at on this chart, and one of them points in the direction of the charts that your subcommittee has.

SOVIETS AND UNITED STATES HAVE COMPARABLE NUMBER OF MISSILES

We now have in terms of comparable missiles about the same number of missiles as the Soviets. It seems to me this does indicate that this is a good time to think about arms talks.

Senator FULBRIGHT. That is right. I agree with you.

Mr. PACKARD. It would have been very difficult to do so back here because the Soviets would not have been willing, in my view, to accept any agreement that would not allow them to come up to this point.

COMPARABLE STRENGTH DENIED

Senator GORE. Mr. Secretary, I don't find myself in agreement with you that we have comparable strength. My information is that the United States is ahead in all respects.

Mr. PACKARD. You have to look at the specific areas. You can't talk about just total warheads.

Senator GORE. Let's begin: How many submarines do we have?

Mr. PACKARD. We are well ahead in submarine launched missiles.

Senator FULBRIGHT. But if the Senator will allow me, I don't want us to persuade the Soviets not to negotiate. They have already indicated they are willing to. I don't want you to make such a strong case that they will back out if you persuade them they are at a disadvantage.

Senator GORE. We are trying to persuade our administration now. But let's just begin, let's begin with the submarines, we have 41. How many do they have?

Mr. PACKARD. I cannot tell you how many they have, outside of operation and testing. They do not have any deployed on station, so far as we know.

Senator GORE. So far as you know, they have none deployed.

Mr. PACKARD. We have to be careful, Mr. Chairman, in the definition of deploying. Everybody seems to have different understandings.

Senator GORE. That is the term you used.

Mr. PACKARD. They do not yet have submarines, to the best of our knowledge, deployed around our coasts with their missiles ready to fire. They have some in the water undergoing operational tests.

Senator GORE. Well, they have actually constructed how many?

Mr. PACKARD. I cannot give you the precise figure on how many they have constructed.

Senator GORE. You can count them on the fingers of your one hand then?

Mr. PACKARD. Mr. Chairman, I would support the general levels of production capability we talked about the other day. They have the ability to produce quite a few of these per year.

Senator GORE. Yes, but they don't have any now.

Mr. PACKARD. Somewhere between six and——

Senator GORE. But I am asking about your statement that we are generally comparable. I just don't think it comports with the facts. I think we have 41 nuclear submarines, each with 16 Polaris missiles. That would total 656 missiles presently on our submarines. The Russians have maybe three or four, with a capacity, as the Secretary said the other day, to build, I believe seven a year, so we are far, far ahead with Polaris submarines.

INTERCONTINENTAL BOMBERS

Now, let us go to intercontinental bombers. We have about 1,000 How many do they have?

Mr. PACKARD. They have a smaller number.

Senator GORE. Much smaller number, about 150, isn't it?

Mr. PACKARD. Something in the neighborhood of 150 to 200.

Senator GORE. We are way ahead there.

Mr. PACKARD. We have about 550, I believe, Mr. Chairman. They have 150 to 200 or so.

Senator GORE. My information doesn't square with yours. I thought we had about 1,000 strategic bombers.

Mr. PACKARD. The B–52s we have, I believe about 500 and some available. Some of those B–52s have been phased out.

Senator GORE. Well now, according to statistics from the budget of the Department of Defense—I will read it to you—I stand corrected, 646, Soviets 150.

Mr. PACKARD. That is right for September 1, 1968.

Senator GORE. Thank you.

But we are still way ahead. We have 500 more than they have, roughly speaking.

Now, let's go to the so-called small missiles, the Minuteman. We have something more than 1,000 don't we?

Mr. PACKARD. Yes.

Senator GORE. What comparable weapon do they have?

Mr. PACKARD. Mr. Chairman, the comparable weapon they have is this yellow segment here.

CONTINUED SOVIET DEPLOYMENT OF SS–9S

Now, the green segment shows the SS–9, and this is the number of SS–9s that they have now. They are continuing to deploy them. It is difficult to predict whether they are going to continue to go up this way or not. But as I outlined in my opening statement there were two things that gave me very great concern when I looked at the status of these SS–9 missiles. One was that in going over the state-

ments that had been made about the previous Sentinel deployment, there seemed to be the feeling that the SS–9 was going to level off at a number somewhere below 200. When I looked at the figures, and the latest intelligence information there had been a recent increase in the number of SS–9s deployed. In addition to that, evidence was available that they have done some testing in putting three warheads in a MIRV kind of an arrangement on the SS–9, and we cannot be sure of whether they are independently guided or targeted or not.

Senator GORE. Let's calculate that now.

Mr. PACKARD. If you look at the——

Senator GORE. May I interrupt for just one moment, if you don't mind, because I want to pursue this thought. I think it is an error to leave this committee or the country with the impression that we have roughly comparable strength. I think we are vastly superior in all categories.

Let's take the SS–9. Secretary Laird estimated that they had 200. We have something more than 1,000 Minutemen.

SOVIET MIRV CAPABILITY

Now, you say you do not know whether or not they have the capability of multiple warheads now, we know we do have. So if we go into the MIRV then we are capable not only with our Minuteman of replacing the single warhead with multiple warheads, but with respect to the submarine missiles we have a capacity which has not been indicated any place that the Soviets have, of multiplying the warheads by, generally speaking a factor of 10, which would be more than 6,000 in a short time. So it seems to me it doesn't exactly square with the facts to say that now would be a good time, because we have about the same strength. I am afraid if I talk too much about our superiority, as Senator Fulbright says, we might talk them out of the notion.

Senator CASE. Mr. Chairman, if you would permit an interruption here——

Senator GORE. Yes.

Senator CASE (continuing). The question isn't only the present comparison, but Soviet capability and intention as to the future, and the Secretary was directing a good deal of his concern to the latter point. I take it as far as that chart is concerned the projected continuing upward line of large missiles of the Soviets is based upon, one, your conception as to their capability and, second, as to their intention now.

Mr. PACKARD. Yes; that is correct.

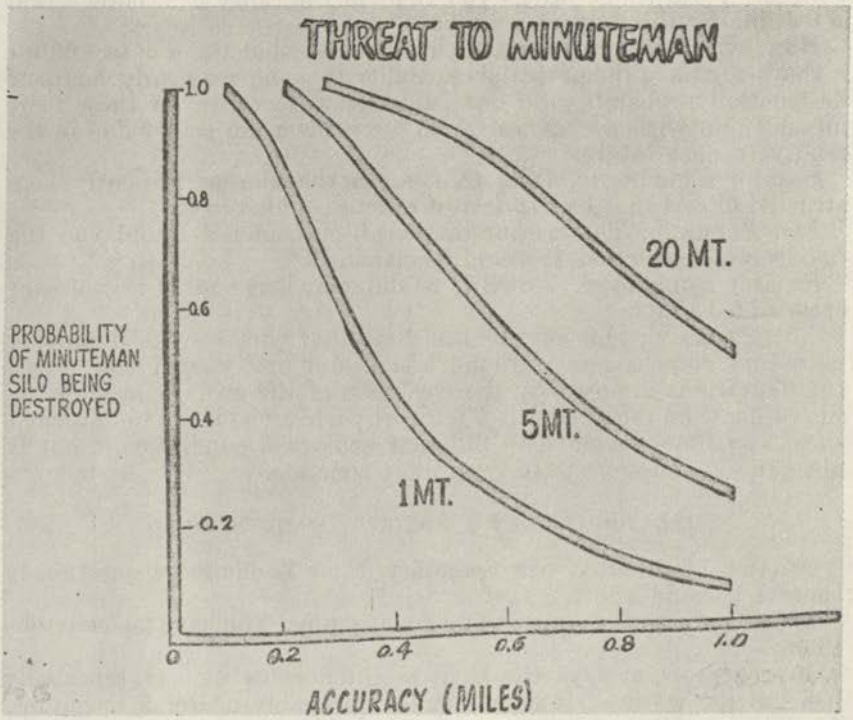
Senator CASE. And that, of course, would bring us at some time in the future to something closer to parity. I don't think just the mechanical comparison of present strength is, by any means, conclusive.

Senator FULBRIGHT. Mr. Chairman, may I interject? You suggested a moment ago you have some charts to show the committee, and I also have some questions. I wonder if we can't allow the Secretary to complete his charts and go on to your charts.

Mr. PACKARD. I will be very glad to go to yours.

Senator FULBRIGHT. Time is running out on us. I think we are agreed on at least the number of missiles and how we interpret them and everybody will have to use his own judgment.

THREAT TO MINUTEMAN



Mr. PACKARD. I would like to go to the next chart, because it will help explain why we should now be more concerned with these large missiles than we thought we needed to be before.

If you will look into the question of how large a warhead is needed to destroy a given sized target, and you related that to the accuracy which that missile has to have—the distance from the hard target that the warhead can land and still destroy the target—you get into a situation like this: With a 20-megaton warhead, if you have 0.06-of-a-mile accuracy, you have a chance of somewhere around 90-percent chance of destroying that hard target.

If that 20-megaton warhead lands within a little less than 0.04, say 0.03 of a mile from the target, you have almost a 100-percent probability that that target will be destroyed—that is, a hardened Minuteman site.

As you go to smaller warheads, the accuracy required to do the same amount of destruction increases. The relationship is not a linear one. It is a close approximation to the cube-root relationship. With a 5-megaton warhead, to get essentially complete probability of destruction of the Minuteman silo, you have accuracies down to 0.02 or 0.25 of a mile. As you get to smaller warheads, you have to get to even more accuracy.

Now, the thing that this chart shows, in combination with the buildup of this SS–9, is that with the size of the SS–9 and the capability

of that vehicle to transport either a 20-megaton warhead or three 5-megaton warheads, brings you right in the range of accuracy that is feasible for this type of a weapon.

Now, without saying what their intent is, what these data told me is that they have the potential capability to achieve a nearly complete destruction probability on our Minuteman force, given these large missiles and with accuracies which we believe are achievable in the relatively near future.

Senator FULBRIGHT. Does that mean the silo as presently constructed or one that had 10 feet of concrete added to it?

Mr. PACKARD. That is our hardened silos, and if I told you the details of construction, it would be classified.

Senator FULBRIGHT. Would it be different if it had 10 feet of concrete added to it?

Mr. PACKARD. One of the things is that you can keep putting more and more concrete around a silo, and pretty soon you get to the limitations imposed by the weakness of the geology around the silo rather than the silo itself. That is why when you move to hardened sites, you have to move to different geological conditions. So it is not quite as simple as putting on more concrete.

MEGATONNAGE OF A SOVIET SS–9 QUESTIONED

Senator SYMINGTON. Mr. Secretary, there is one more question in context I would ask.

We talk about 25 megatons and 20 megatons. You have 20 megatons there.

In the press, it says the Central Intelligence Agency reportedly believes the warhead is much smaller, probably nearer 5 megatons. I have had quite a few people write me since the first hearings, protesting that the SS–9 cannot be considered to have megatonnage in the 25-megaton range.

I think I am on all the committees involved with national intelligence. How do we arrive at this arbitrary figure of 25 megatons, or even 20 megatons?

Mr. PACKARD. This is a figure which is in a range of estimates. The best information I have seen is that they do have variable warhead sizes on these missiles, and they do have the capability of carrying a 25-megaton warhead.

Senator CASE. That would be one, Mr. Secretary.

Mr. PACKARD. That would be one 20- or 25-megaton warhead.

Senator CASE. And if they went to a MIRV arrangement, they could be reduced in size?

Mr. PACKARD. The key point about the SS–9 is that they can go to a MIRV arrangement and still carry some large warheads. If we go to a MIRV arrangement on our Minuteman, we start out at this point, if you carry smaller warheads you require a very high accuracy in order to achieve a kill.

Senator GORE. That brings up the question of the distance between the Minuteman sites.

Mr. PACKARD. Yes.

Senator GORE. Can you give us that?

Senator SYMINGTON. Just to finish that point, inasmuch as there is the statement of high intelligence in the Government field that, without being "MIRVed" you might say, probably the SS–9 is

nearer 5 megatons than 25 megatons, could I ask, is there any disagreement in the intelligence community about the size of the warhead of the SS–9?

Mr. PACKARD. Senator Symington, I do not know the extent of the difference of the views in the intelligence community. The important point here, really, is not what the SS–9 actually has, but that it has a payload capability of having this size warhead. Whether they have chosen to put a different one on it is, I think, the flexibility that they have. It is really the payload capability that we are talking about, and that payload gives you the possibility of using warheads which are large enough to give us a very serious problem.

DISTANCE APART OF OUR MISSILES

Senator CASE. Mr. Secretary, may I correct a misapprehension, if it is one, on my part? Are not most of our missiles 10 miles from each other, so that would require, in effect, an SS–9 for each one of our missiles?

Mr. PACKARD. Senator Case, I cannot tell you how far apart these missiles are, but it is true that it will take one SS–9 for one of our missiles unless they put three or so independently targeted warheads on their missiles.

Senator CASE. Independently targeted?

Mr. PACKARD. Independently targeted.

Senator GORE. Then they would not have the same explosive capability.

Senator CASE. But quite accurate.

Mr. PACKARD. The SS–9 is large enough so they could put in several warheads per missile; in fact, they could be working on that problem now, that is what troubled me when I looked at this.

Senator GORE. May I say in one respect, you and I are kindred souls. I am having about as much difficulty in getting to my charts as you did to yours.

Mr. PACKARD. I will try to move along, Mr. Chairman, so that you can get to your charts.

Senator CASE. We have an advantage because he cannot stop you but you can stop him. [Laughter]

Mr. PACKARD. Again, there is a very important point there. We talk about MIRVs for different kinds of missions. With regard to the MIRVs that we are working on, we are starting from this point: when you use a MIRV to attack a city, you can put in a large number and you do not have to be very accurate. You cannot use just any kind of multiple system to attack hardened sites. They have to be fairly large and they have to be accurate. The Soviets could have this kind of capability in the 1970s. I cannot guarantee what their intention may be, but they can do it.

I do not think I will take any more time on this chart. I would like to save some time for your charts, Mr. Chairman. Let us move ahead and get into some of the alternatives that we looked at.

THICK ANTISOVIET DEFENSE OF CITIES

Now, when I began this assignment, I decided that it would be appropriate to go back and look at the various possibilities that had been considered; to look, as I have indicated, at the technical capa-

bility of the Sentinel system to see what the status was. I wanted to see whether it could, in fact, do the job. It became quite apparent to me, as I think it had to most people in the past who had studied this, that a thick anti-Soviet defense of our cities just did not make any sense.

It was very easy for the enemy to respond to almost any thick ABM deployment you put around the cities because the enemy could use these multiple-warhead MIRVs which did not need to be accurate, and could be small—in fact if they are small they could be more effective than a few large ones.

This is the argument that brought many people to say that if you start to deploy a thick system in order to defend your cities you are going to need an even thicker one, and there is no end to it. And after I looked at that matter, I came to that same conclusion.

ORIGINAL SENTINEL PLAN

Now, we looked at the original Sentinel plan, and the original Sentinel plan did have the capability of defending Minuteman sites. It would have provided area protection against an early Chinese threat, against an accidental launch, but it was deployed around cities. In the discussions it was quite apparent that there were people who still felt that the deployment around the cities would provide a base on which to build up a thick system. If there were any significant conclusions that we came to, which were different than those arrived at in the past, it was that it was not desirable to have the location near the cities because that was the sort of buildup that would lead to the thick system, and that the problem here is to protect your deterrent and avoid a war, and not to try to limit the damage to the cities if we get into a war.

Everybody would like to have damage limiting, and there are many people who think that we should include damage limiting in our defenses.

Senator GORE. May I say this is, to my mind, the only really valid support for an ABM, would be in case of a war to reduce the losses of the American people, say, from 120 to 80 million.

I voted against this program last year. I did not make a determined fight against it, and largely because I thought there was some merit in the limitation in loss of life. But then when, because of a commotion around Boston and Libertyville and Seattle, it no longer became a question of value. It seemed to me then, if I may use a phrase that has now become trite, that here was a missile system, a defense system, that had been justified on half a dozen bases and, therefore, it was just a missile defense looking for a mission.

Mr. PACKARD. Senator Gore, I do not think anybody would disagree with the proposition that if we could protect our people by any conceivable means, ABM systems or otherwise, that would be a very important objective.

The problem is that if you do that in such a way that you do not help protect your strategic retaliatory forces you may not achieve the objective, and that is the deterrence.

Senator GORE. I agree and again I voted against it on balance.

MODIFIED SYSTEM

Mr. PACKARD. The modified program we talk about puts the emphasis on the protection of our deterrent, not because we do not want to protect our people—God knows we would all like to do this if we were able to do so—but because if we deployed this system around our cities, the enemy could still MIRV his missiles, and there is not any way in which you really gain anything by this course. Furthermore, you give the impression that you are trying to build up a first strike capability, and in my view you reduce your deterrence.

Now, that is basically the argument that I came to in saying that we should not follow the Sentinel approach and that we should move to a different approach to the problem. In doing so, this enabled us to utilize the technical capability of this system to protect our deterrents. If it had been possible for us to protect our cities, I would have been the first to have encouraged that.

We talked about the possibility of no ABM defense at all——

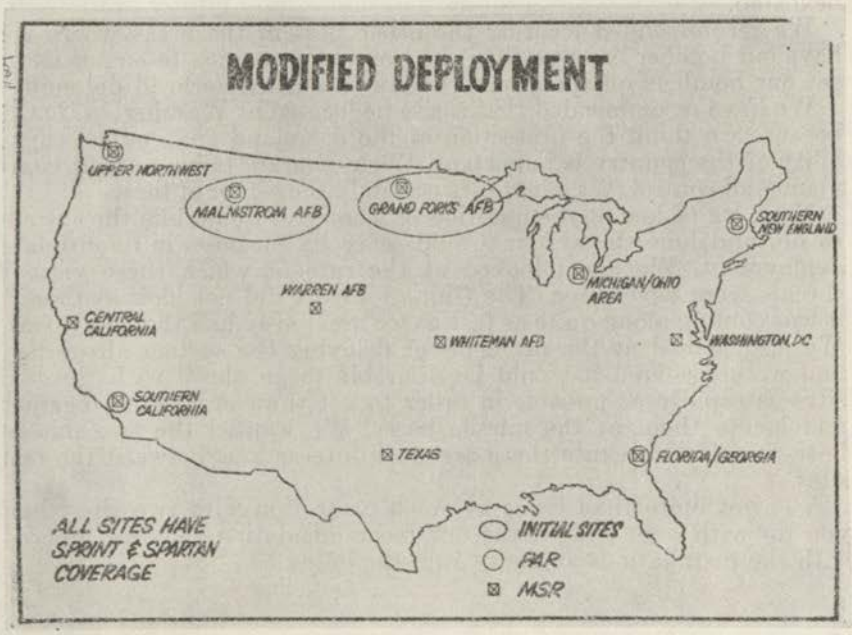
Senator GORE. We debated that.

RESEARCH AND DEVELOPMENT

Mr. PACKARD. Or the possibility of going down to simply a research and development program, which is one course that we could have undertaken.

As I indicated to you, there was another course which we had, and it was to build a prototype system on Kwajalein. That course, or falling back on a strictly R. and D. program would have resulted in at least a 2-year delay, and would have brought us up, in my view, to 1976 or beyond before we could possibly have this ABM system operational.

PROPOSED MODIFIED DEPLOYMENT



Let us go quickly through the system we are now proposing. The first recommendation we made was to change the emphasis of the system to add to our deterrent capability and to provide the additional protection that we are talking about for those missiles. In so doing we have the same area protection capability, we can provide about the same protection from the so-called early Chinese threat or from an accidental launch by any power.

Now, the specific change we made in the system was to take the site which is New England, and add a radar face to the PAR—the PARs are indicated by circles here, and the MSRs by the squares with the cross in them.

We added a radar face so that this PAR would not only look to the north, where a threat might be expected from land-based missiles, but also look over the ocean for a submarine-launched missiles.

We also added a PAR in the southeastern part of the United States again with two faces to provide coverage over the ocean for the submarine-launched threat at that point.

We plan a PAR site here to provide for coverage over ocean for the northwestern part of the country, and likewise another PAR here to provide coverage for the southwestern part of the country.

Those are changes, those are additions, that were talked about, and they added a substantial increment to the cost, but we found in looking at the program we could utilize fewer total sites and keep the total costs within reason.

We kept the line of PARs across the northern United States that are directed mainly at the threat from the north.

The site locations have been selected to provide protection of our deterrent forces—the Minuteman bases here at Malmstrom in Montana, and Grand Forks in North Dakota, and two additional Minuteman sites here, I believe, which we would undertake as the next step.

We recommended locating the other sites in the areas where we have our bomber bases so they can provide protection to enable us to get our bombers off the ground before an enemy warhead detonates.

We have recommended that a site be located at Washington, D.C., because we think the protection of the command and control capability of the country is important. When you are talking about command and control, Washington is certainly the center of that.

Now, we looked at the question of what you would like the system to do, and how the system would serve its purposes in its ultimate deployment. We again looked at the rate at which these various threats were developing. The Chinese threat did not look as though it was coming along quite as fast as we previously had thought it was. We also looked at the problems of delaying the system altogether, and we considered it would be desirable to go ahead with the two sites as rapidly as possible in order to get the components together and locate them at the missile bases. We wanted the two missile bases involved because there are some interactions between the two sites.

You get more than twice as much protection with two sites than you do with one, and it was our recommendation that we proceed with the installations at the two missile bases.

FURTHER SITE ACQUISITION

The second recommendation was that we proceed to acquire the sites for the rest of the system.

Senator GORE. Has the President approved both?

Mr. PACKARD. The President approved both.

Senator GORE. That is not a modified system; that is a big system.

Mr. PACKARD. No, he simply approved the acquisition of the land for these sites.

Senator GORE. What are you buying the land for if you do not intend to use it?

Mr. PACKARD. The reason we recommended that we proceed with the acquisition of the land was that in takes time to select sites, negotiate for the land, and the engineering, and so forth. That would take somewhere between 6 to 9 months, or more, and we thought it would be wise to proceed with site acquisition so that if the President did decide to move ahead on the deployment, he would not have the delay involved of getting the land. That is the only reason. It would not be absolutely necessary to buy the land now, but we felt it would be a wise move.

Senator GORE. Is there any site development involved in your plans?

Mr. PACKARD. There would be no site development involved except for the two sites which would be installed as complete systems.

CONGRESSIONAL AUTHORIZATION NEEDED

Senator FULBRIGHT. Mr. Chairman, I do not want to delay this; I want to see what your charts are. Do you take the view that you need no further authorization from Congress to proceed with this completely different program, different from the one that had been planned?

Mr. PACKARD. This plan is being recommended to the Congress through our budgetary——

Senator FULBRIGHT. There will be an authorization and an appropriation?

Mr. PACKARD. This will be recommended through the regular procedures.

Senator FULBRIGHT. That is what I mean.

I hope you are not proceeding on the theory that because the Congress has already approved the former Sentinel system, that you are entitled to go ahead with the new one as if we were committed. I do not consider that we are. I hope we are not.

Mr. PACKARD. I do not, Senator Fulbright.

Senator FULBRIGHT. Good.

Mr. PACKARD. We are recommending a new funding schedule.

Senator FULBRIGHT. Good.

Mr. PACKARD. In this funding schedule in the fiscal year 1970 budget it will be necessary for us to proceed in such a way that the Congress will have ample opportunity to look at the whole program.

Senator FULBRIGHT. Good.

The program you are talking about now must await the authorization; is that right?

Mr. PACKARD Yes.

Senator GORE. So, unless the Congress approves, this will not proceed.

Mr. PACKARD. I do not see how it can be any other way.

Senator FULBRIGHT. I thought perhaps you were proceeding under the former authority.

Mr. PACKARD. Well, let me say this, we are proceeding with some of the research and development work that was authorized——

Senator FULBRIGHT. Nobody is objecting to that.

Mr. PACKARD (continuing). Under the previous system.

Senator FULBRIGHT. We hope that is all you will do.

Mr. PACKARD. There will be no installations until——

Senator CASE. This is a very refreshing change, Mr. Secretary, and I commend you.

Senator FULBRIGHT. I did not understand that.

Senator GORE. We are approaching a decision, I assure you.

LEADTIME ON PRODUCTION UNITS

Senator SYMINGTON. About the leadtime of bases, wouldn't leadtime on some of the production units incident to construction and installation of the missiles themselves be longer than any 9 months leadtime with respect to the bases?

Mr. PACKARD. It probably would be, but it is just a little hard to know. But we thought this was an option that would not cost very much money and would provide assurance that you did not have unnecessary delays in case you wished to go ahead on a crash program.

Senator SYMINGTON. Thank you.

Senator GORE. Will you proceed.

Mr. PACKARD. Let me just go through the last chart here very quickly.

Senator CASE. May I just ask one question? I am sorry, but this is a technical matter, and I think the charts our colleague has are probably a good basis for presenting positions.

Senator GORE. They are not professional.

Senator CASE. They are not professional and they are not technical.

Senator GORE. I am not sure about that.

COVERAGE CAPABILITY OF PERIMETER RADAR

Senator CASE. These perimeter radars, what is their capability as far as covering the earth goes? How much protection do they give, are there blind spots, and so forth, and how many of them are necessary for a complete coverage?

Mr. PACKARD. I do not have the fan pattern of these particular radars, but they are located so there would be adequate overlap. There would be some small areas here in the center of the United States which would have coverage from other radars.

But the plan is laid out so we would have radar coverage of any area where we think the Soviet missile-launching submarines would be likely to be deployed.

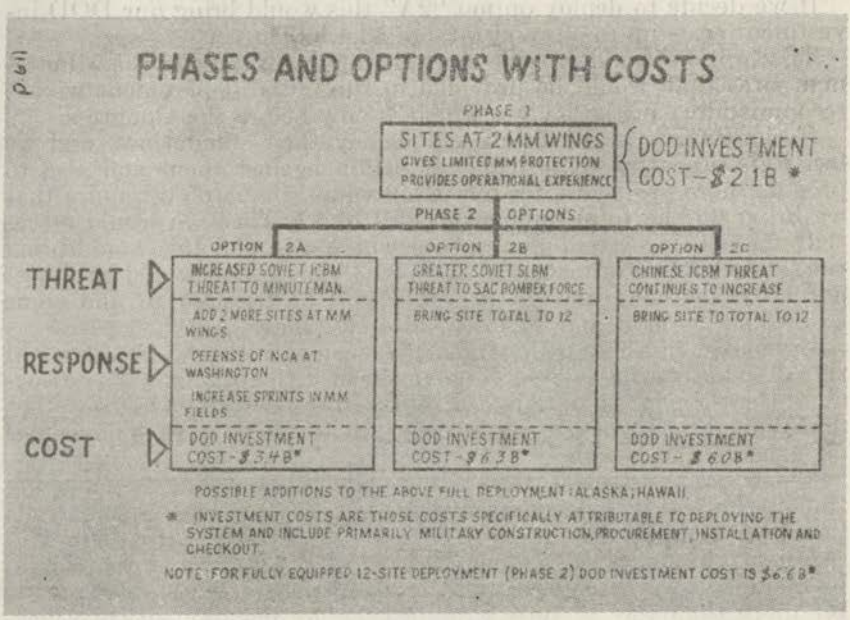
Senator CASE. This does not cover one thing, then, and that is the fractional orbit attack; is that right?

Mr. PACKARD. These radars have fans which go out in this way, so that what happens is that you would have an area—I do not know

exactly what the fans would be—something like that—you would have an area here that would not be protected, but you would have radar coverage further out there. (Indicating.)

Senator CASE. Thank you.

COSTS OF THE PROPOSED SYSTEM



Mr. PACKARD. Let me just skip down to the final chart. We have been over the various points here, and we will show you this chart with the costs on it.

We are proposing that we proceed with phase I; that is, deployment around two Minuteman wings, and providing funds to acquire the land for the remaining sites.

This initial move gives limited protection to all our Minutemen. It gives us the opportunity to get these two systems put together, shake out the bugs, and get them underway. When they are completed, we will have some useful protection, but it will not be sufficient protection to provide what you might need in the long run if you want to protect all of our Minutemen with terminal defense.

This is a move to make sure we provide time and begin the job. There are various choices, options, and ways in which we can go from there.

This first phase involves DOD investment costs of $2.1 billion. We are recommending to the Congress a budget for fiscal year 1970 which involves $800 million. In other words, the deployment we are recommending provides for about a $1 billion reduction in the fiscal year 1970 authorization from that which would have been necessary for the Sentinal system which was sent up by the previous administration.

Now, the options can be shaped to meet the threat. If the threat is in the form of an increased Soviet ICBM capability against our Minuteman—if, for instance, the SS–9 deployment continues and if

if we find evidence they are indeed proceeding with those three warheads per missile—we can move toward two more sites at Minuteman wings. We can put in, if we wish, the defense of the national command authority at Washington. We can also increase the Sprints in the Minuteman fields to provide additional protection if we find it is desirable.

If we decide to deploy option "2A" this would bring our DOD investment costs up to a grand total of $3.4 billion.

That option would provide more thorough coverage of the Minuteman sites than would be provided in the initial deployment we are recommending in the budget which is now before the Congress.

If the Soviets move ahead and deploy their submarines, and we feel it is necessary to provide protection against them and also to provide more protection for our Minuteman, that would require that we bring up the total number of sites to 12. Then we would essentially install the system on a countrywide basis, and this would bring the total DOD investment cost up to $6.3 billion. This would be almost a full deployment, though it would still be possible to add some additional Sprints, and so forth, at that point.

If instead of the SLBM threat, we consider the Chinese ICBM threat to be growing, we could move ahead with option 2–C, a deployment very similar to option 2–B, but with a few things left out. The deployment in this case would come up to about a $6 billion level on a comparable basis.

These are investment costs specifically attributable to deploying the system and include primarily military construction, procurement, installation, and checkout.

For a fully equipped system, with all of the capability that might be included to provide for all of these threats, we would need a little bit more than this. A fully equipped 12-site deployment, phase II, would come to an investment cost of about $6.6 billion.

You will note that we did not include on the map the deployments to protect Hawaii and Alaska.

We would think that is probably not desirable, but if evidence indicated later that it should be done, protection for Hawaii and Alaska could be added and this would bring the total investment cost up to a little over $7 billion. That is why we talk about the range of between $6 billion and $7 billion for a full deployment.

The cost depends upon the options which we select.

Senator CASE. That is in addition to missile base protection?

Mr. PACKARD. These are the total costs, including the $2.1 billion for phase 1. In other words, you start out with the first step which is a total of $2.1 billion; the next brings this total to $3.4 billion.

Senator CASE. I see.

Mr. PACKARD. These are the total investment costs estimated on a comparable basis with the prior Sentinel system.

We cannot predict that we have provided enough margin for inflation in here, but I think there is one very important point in this deployment: it does not provide the kind of an option that should build up to a big system.

The costs might go up if we do not manage the system as well as we should, but it is not going to go from $6–$7 billion to $60–$70 billion, and that is a very important factor.

CLARIFICATION OF FIGURES

Senator JAVITS. Mr. Chairman, is this a cumulative figure?

Senator GORE. He said it was.

Senator JAVITS. It is cumulative over how many years?

Mr. PACKARD. Well, the earliest deployment of the first two sites would be the spring of 1974. We cannot possibly go from there, even if we started now on a complete deployment, before 1976, and it probably is going to be 1977.

I think for general consideration of this matter we ought to say that it would require between $6 billion and $7 billion over a 6- to 7-year period, so the average expenditure might be $1 billion per year. It would not necessarily average out uniformly, but if the deployment went along on a stretched-out basis it would be reasonably close—and that is what we are talking about.

Senator JAVITS. If the Chairman would mind clarifying this, you start with $2.1 billion. That is 1 year. You get it appropriated right away, you say an average a year——

Mr. PACKARD. No, this is the total cost to complete the two deployments.

Senator JAVITS. How many years?

Mr. PACKARD. We are only asking in fiscal year 1970 for $800 million of this $2.1 billion.

Senator JAVITS. Thank you.

Mr. PACKARD. There may be a little carryover from the past, but that is approximately right.

Senator JAVITS. I thank Senator Case.

Senator CASE. Thank you.

AREA PROTECTION BY SAFEGUARD SYSTEM

I have a point, too. This Safeguard has been suggested as useful to protect against a mistaken launch, or somebody pushing a button by error. This would be effective only if it were fully installed, is that not true; that is, as far as the whole country goes, otherwise it would be only small areas?

Mr. PACKARD. That is correct, Senator Case.

We get the protection, by the area coverage because the Spartan missiles have a very long range and can cover a large area. The footprint of protection depends upon the direction from which the incoming threat might appear, and it is kind of a teardrop-shaped pattern that would go around each one of the 12 sites we propose here. Area protection would be provided for the entire country with the exception of a small section down here, where the protection would not be quite as heavy as over the rest of the country.

We do not have as much overlap in this area protection as was present in the initial Sentinel plan. In looking at it, however, it is my view that we will have quite adequate area protection for the major population centers of the country. Furthermore, there are some developments underway which we believe will enable us to provide a little more range in the Spartan missile by the time it is deployed, and I have no concern about the capability of the system to provide area protection against a light Chinese threat or the random——

Senator CASE. Occasional launch.

Mr. PACKARD. Occasional launch.

MONEY PUT IN ABM PROGRAMS TO DATE

Senator SYMINGTON. Mr. Chairman, if I might ask one question, leaving aside the Nike-Ajax or Nike-Hercules, relative short-range ground to air, but including the Nike-Zeus, the Nike-X and the Sentinel, how much money have we put into this overall program to date?

Mr. PACKARD. Senator Symington, I cannot give you that figure offhand because, as you know, you are talking about the R. and D. going clear back to the early days.

Senator SYMINGTON. Going back through the Nike-Zeus.

Mr. PACKARD. That work was done before my time. I will be very happy to get that figure for you.

Senator SYMINGTON. If you would supply it for the record?

Thank you, Mr. Secretary.

(The following information was later supplied by DOD:)

The total expenditure for R. & D. on Nike-Zeus and Nike-X through fiscal year 1968 by the Department of the Army is about $3.5 billion.

EFFECT OF NOT DEPLOYING BEYOND TWO MISSILE SITES

Senator SYMINGTON. Then, as I understand it, from Senator Case's question, if we go ahead with this, and then do not continue beyond these two (a) we do not have a defense, and (b) we lose $2.1 billion; right?

Mr. PACKARD. We have, Senator Symington, a defense of those two Minuteman fields if we go ahead with the $2.1 billion phase I deployment.

Senator SYMINGTON. Of only the two sites? I see.

Mr. PACKARD. I think that is one of the important advantages of this plan, we do get some value if we go no further than these two sites.

Now, I will be very frank with you in saying you will get better value in terms of total cost if you go ahead with the whole system. But there may be very valid reason why you would not want to go beyond phase I at this point. Even if you don't, you are still going to get some useful protection for your Minuteman sites.

Senator GORE. Thank you, Mr. Secretary.

Mr. PACKARD. Mr. Chairman, thank you very much.

(The remainder of Mr. Packard's charts are on file with the committee.)

Senator GORE. Thank you very much. It is very interestingly and very ably done.

CURRENT STATUS OF NUCLEAR ARMS RACE

Entirely in an amateurish way, my own staff and the subcommittee staff have tried to get some charts together to reflect the current status of the nuclear arms race, and some of the implications of the escalation that is being proposed.

When I describe this proposal as an escalation, and you say it is not an escalation, I am reminded of the exchange you had with Senator Fulbright concerning what is a small missile. A megaton missile fifty

times as large as that which destroyed the Japanese cities is not conidered a small missile. So there is an old adage that a rose by any other name smells just as sweetly.

I hope to give a visual contrast between our points of view, and after I present these charts as briefly as I can, will invite you to respond.

U.S. IS AHEAD IN NUCLEAR WEAPONS

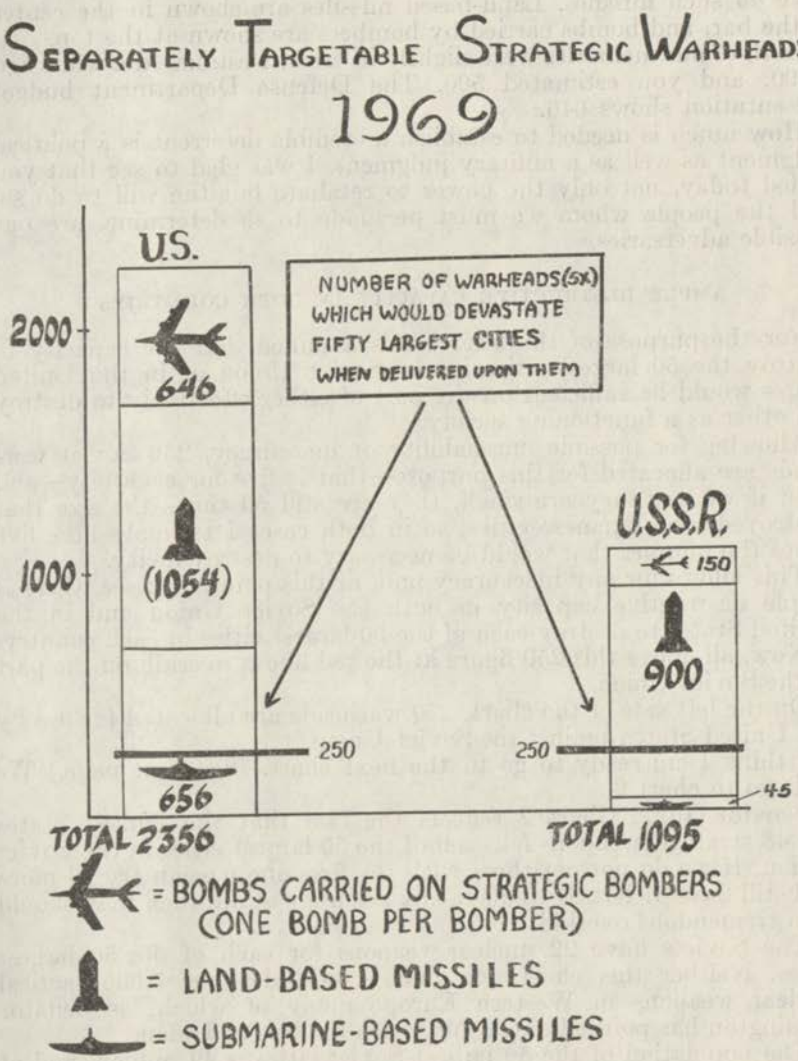


CHART 1.

Chart 1 reflects the situation today. The United States has enough nuclear weapons to attack about 2,400 different targets in the Soviet Union.

The Soviet Union can attack now about 1,100 different targets. I might say that I have done the very best I can to use the information, and the statistics, which you, yourself, and Secretary Laird have presented, plus that which is in the most recent Defense Department budget presentation.

Chart 1 clearly shows that the United States is ahead. Submarine-launched missiles are shown on the bottom of the bar, 656; Soviets have 45 such missiles. Land-based missiles are shown in the center of the bar, and bombs carried by bombers are shown at the top.

Both of our memories were slightly in error. I estimated a while ago 1,000, and you estimated 500. The Defense Department budget presentation shows 646.

How much is needed to establish a credible deterrent is a political judgment as well as a military judgment. I was glad to see that you added today, not only the power to retaliate but the will to do so, and the people whom we must persuade to so determine, are our possible adversaries.

AMPLE DESTRUCTIVE CAPACITY IN BOTH COUNTRIES

For the purpose of this chart, it is assumed that the capacity to destroy the 50 largest cities in the Soviet Union or in the United States would be sufficient on the part of either effectively to destroy the other as a functioning society.

Allowing for possible unreliability or inaccuracy, 250 Soviet warheads are allocated for this purpose—that is five for each city—and even if we say they are small, they are still 50 times the size that destroyed two Japanese cities, so in both cases I estimate here five times the number that would be necessary to destroy a city.

This allows for any inaccuracy and, at this point, you see, there is ample destructive capacity in both the Soviet Union and in the United States to destroy each of the 50 largest cities in each country.

Now, all above this 250 figure at the red line is overkill on the part of the Soviet Union.

On the left side of the chart, 250 warheads are allocated for use by the United States against the Soviet Union.

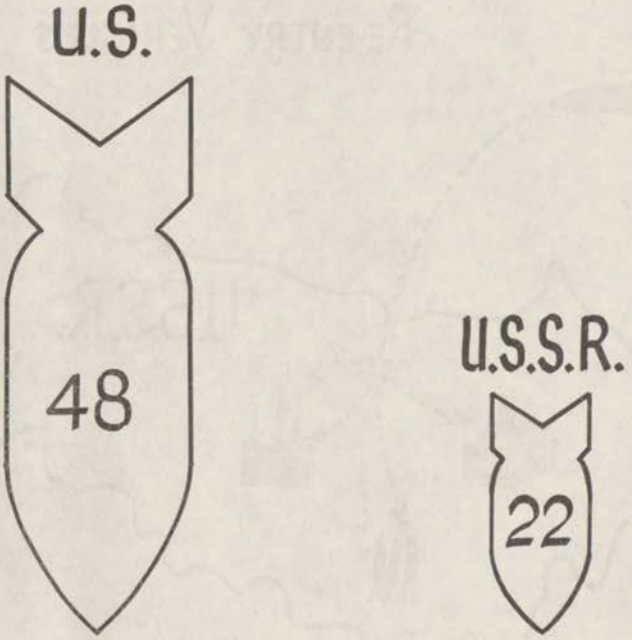
I think I am ready to go to the next chart. (See next page.) We will go to chart 2.

Senator GORE. Chart 2 reflects the fact that the United States has 48 strategic weapons for each of the 50 largest cities in the Soviet Union. If we do not get them with the first one we can try 10 more and still have 37 left. If we have any accuracy at all, then that should be a tremendous overkill.

The Soviets have 22 nuclear weapons for each of our 50 largest cities. Neither this chart nor chart 1 includes our 7,000 tactical nuclear weapons in Western Europe many of which, as Senator Symington has pointed out, could reach the Soviet Union.

The population of the 50 largest Soviet cities is 49 million, and of our 50 largest cities, 39 million.

1969 OVER-KILL RATIO



SEPARATELY TARGETABLE STRATEGIC WARHEADS PER CITY, FOR FIFTY LARGEST CITIES.

POPULATION 50 SOVIET CITIES 49,000,000 1960 CENSUS
POPULATION 50 U.S. CITIES 39,000,000

CHART 2.

MULTIPLE WARHEADS GUIDED TO SEPARATE TARGETS

The Department of Defense plans to deploy separately targetable warheads on our missiles. These warheads can be guided to separate targets. Of course, this is MIRV, as illustrated by chart 3.

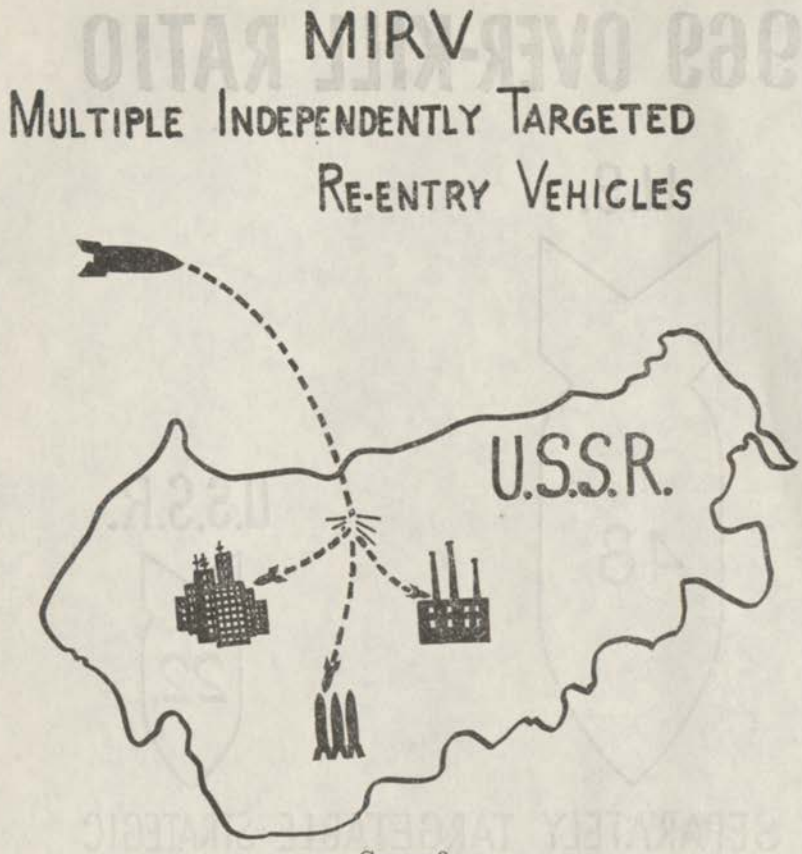


CHART 3.

On the Minuteman it is estimated we can put three warheads. On the Polaris missiles we can place 10 or more warheads that can be separated and guided to individual targets with great accuracy.

U.S. NUCLEAR CAPACITY AFTER DEVELOPMENT OF MIRV

Senator GORE. Chart 4 (see foldin facing page) shows the escalation of our nuclear capacity which will result from full deployment of all MIRV.

On the left are the weapons we now have, 2,356. On the right are the weapons we would have after deployment of MIRV. A double-sized chart, of course, is required to show our capability in 1974.

Now, notice, Mr. Secretary, that by 1974 we would still have the 250, five for each of their 50 cities, and in addition the thousands of other weapons shown on the chart as overkill; and yet we want to start another weapons system. This is madness.

Pretty soon something is going to happen if the Soviets and the Americans keep up this business, something will happen, and we will blow the whole world up.

Indeed, if MIRV is deployed, it will become more difficult for either side to know how many warheads the other has. The number of warheads resting on each missile launcher can be changed from three

U.S. Separately Targetable Strategic Warheads
BEFORE AND AFTER MIRV

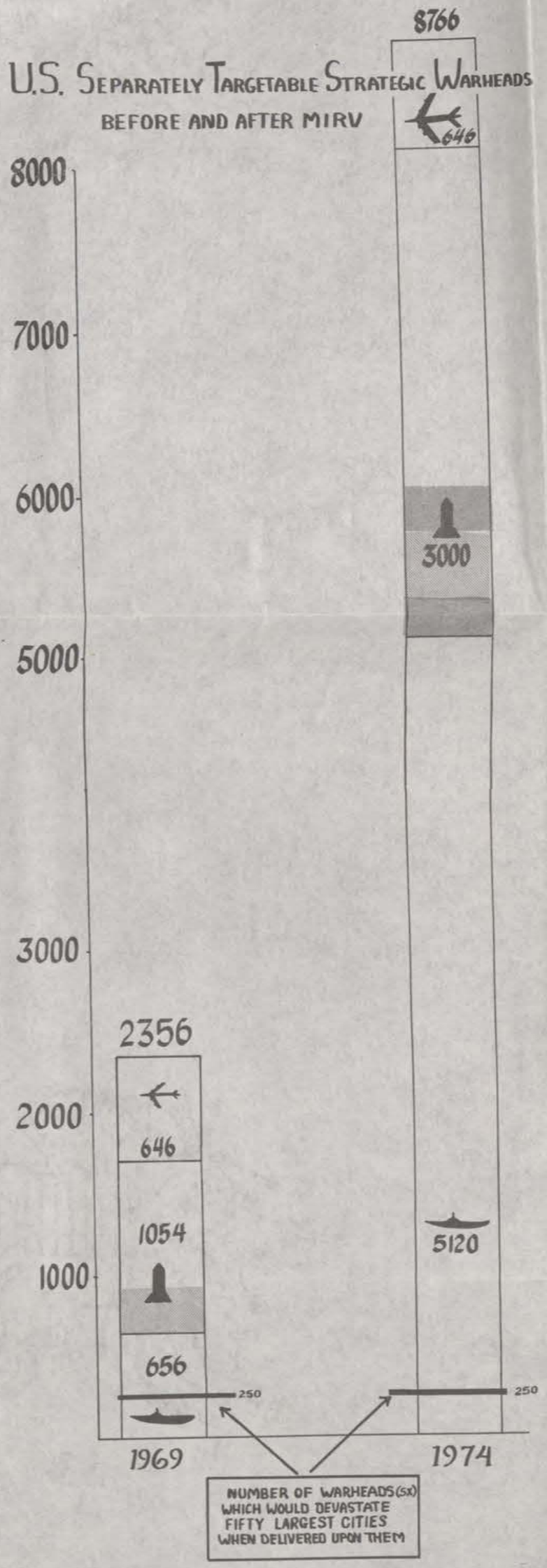


Chart 4

U.S.S.R. Separately Targetable Strategic Warheads
BEFORE AND AFTER MIRV

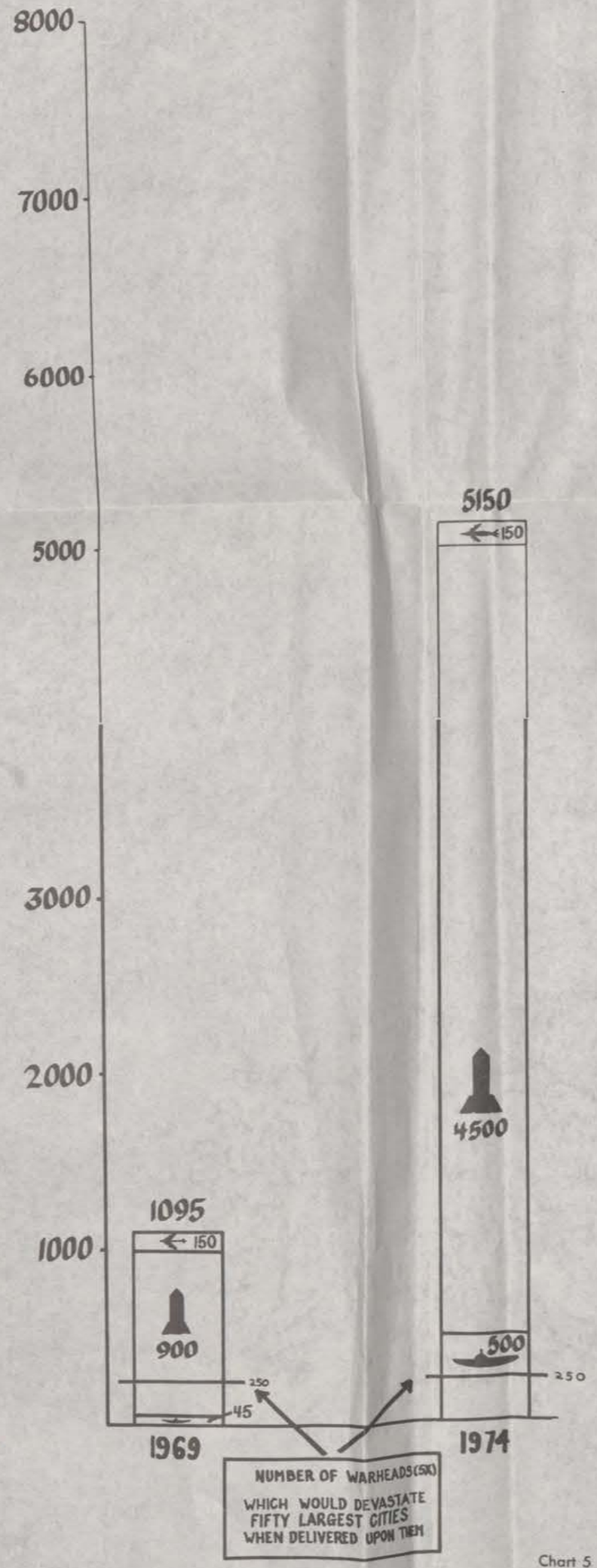


Chart 5

An Offense - Defense Race
SEPARATELY TARGETABLE STRATEGIC WARHEADS
IF BOTH SIDES BUILD MIRV
AND EXPAND ANTI-BALLISTIC MISSILE DEFENSES
CONTINUALLY

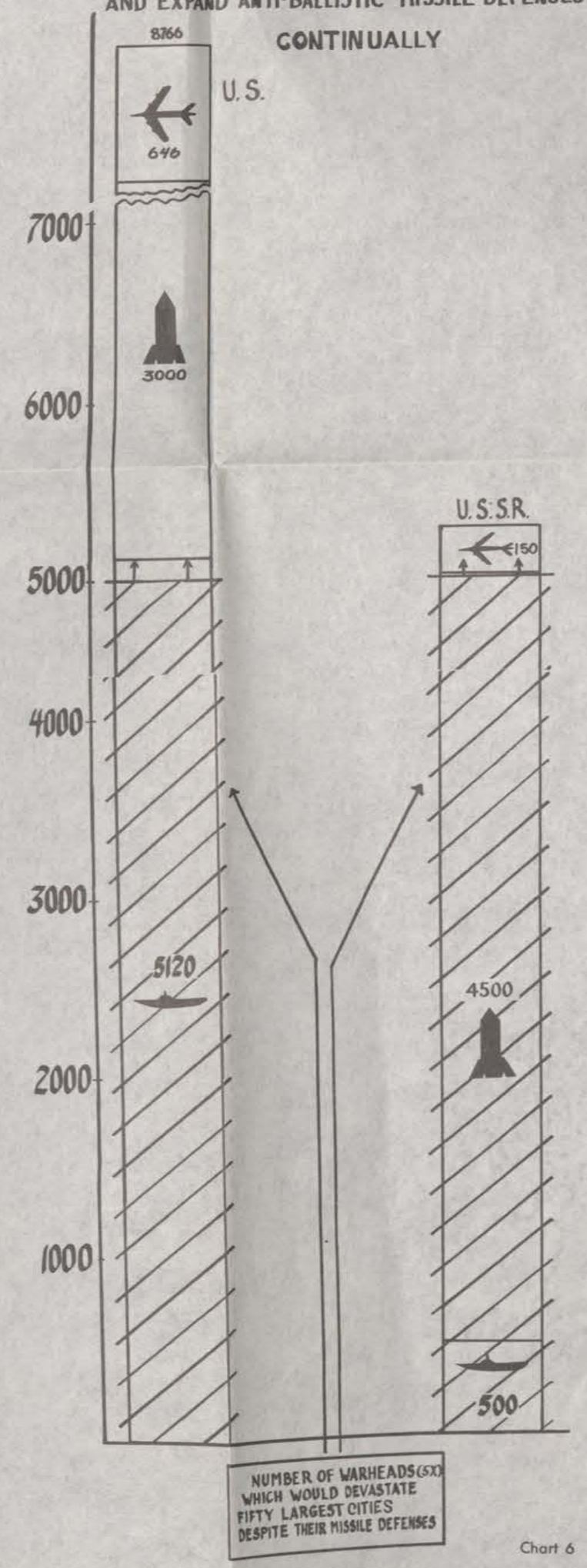


Chart 6

26-758 O - 69 (Face p. 300)

to five or 10 or even more. This will complicate any future arms agreement by making verification very difficult on each side.

We can expect the Soviets to react to our decision to deploy MIRV. We can expect them to react if we deploy ABM by acquiring more warheads as, indeed, they are proceeding to do in response to our own escalation, and then we respond to their escalation.

SOVIET BUILDUP

Now, I would like to turn to chart 5. (See foldin facing page 300.) On the left of chart 5, we see how many targets the Soviet Union can attack with warheads that the Department says it now has.

Let us assume that the Soviet land- and sea-based forces grow at the rate reflected in the Defense Department charts. The column on the right shows how many targets the Soviet Union could attack in 1974 if it also developed its version of MIRV and continued its buildup at the present rate. Of course, a double-sized chart is needed for the Soviet capability, too. Again you see what the overkill is.

Our buildup and the Soviet buildup illustrate the action and reaction phenomenon of which Secretary McNamara warned.

ANTIBALLISTIC MISSILE DEFENSE

Now, let us speak about antiballistic missile defense. one of the Department of Defense charts assumes that the Soviet Union will continue to build nuclear missile submarines at the rate projected by the Department.

In his presentation Secretary Packard stated that if this occurs—this was the last chart he talked about—if this occurs, the Safeguard missile system should not be limited to two defense sites in Montana and North Dakota, but that a complete 12-site defense system should be deployed to protect our bomber bases.

Surely we cannot expect the Soviet Union to stop with one or two Polaris-type submarines when we already have 41, and when we continue to go forward, to use Secretary Laird's famous phrase, on the basis of our announced plans. Therefore, we must consider the overwhelming probability that at least one of the contingencies prescribed for Safeguard ABM expansion in the last chart the Secretary gave us will occur. Thus, what is really being proposed by the Department of Defense is the complete 12-site ABM system. If the President's "option" is conditioned upon the Soviet Union discontinuing its buildup, he surely will have no option.

If we begin the deployment of such an ABM system as the Department proposed, the Soviets will likely decide that they also must have an ABM system to cover their entire country, not just Moscow.

If we assume that the Soviets deploy an ABM system with 1,000 interceptor missiles, we would have to assume that it might work. If it did, they could shoot down the first 1,000 incoming missiles. If the Soviets possess this capability, we would need at least 1,000 additional missiles for the task of destroying 50 cities beyond what we would need if they did not have such a system. Actually we would probably assess our additional needs at more than 1,000 additional warheads, since some of our weapons just might not work.

Indeed, both sides would keep secret the number of their interceptors. Each would fear that the other had more interceptors than are known and each would, therefore, feel compelled to deploy still more offensive missiles, suspicions and doubts and apprehensions growing meanwhile, and each would probably deploy more interceptor missiles just to maintain a margin of safety.

RESULT OF ARMS RACE ESCALATION

If the arms race continued to escalate in this way, we could have a situation like that portrayed in the last chart.

With each side building ever bigger ABM systems, the number of warheads needed to insure the capacity to devastate 50 cities steadily increases. The red line, as you notice, moves up and up, the margin of overkill or safety, however, becomes relatively lower. Neither side achieves anything in the way of enchanced security. This is an ABM arms race in action, an escalation of the nuclear arms race.

On chart 6 (see foldin facing p. 300), the red lines have been placed at an arbitrary position on the chart. We finished this late last night in my office, and I apologize for its amateurish appearance, but it is the best we could do. Just where the red lines might be would depend upon the number of interceptor missiles deployed by each. For example, if 2,500 interceptors are deployed, and if two offensive missiles are targeted to each, then 5,000 missiles would be required to deal with the defense. If more interceptor missiles are deployed, the red lines would have to be moved higher.

INEVITABLE ACTION-REACTION CYCLE

The point is that the inevitable action-reaction cycle which we are imploring our Government to try to stop, of an arms race, would assure that eventually the red lines would move up proportionately in each case.

I have prepared these charts, or rather the staff and I have, to illustrate what happens when both we and our major nuclear adversary each seek to counter the move of the other in what I regard as a senseless arms race that poses potential disaster for the whole world.

In my view it would clearly be in the interests of our national security to defer the deployment of ABM and to seek promptly negotiations with the Soviet Union before time runs out.

After another cycle of action and reaction, there may well be no possibility of negotiating an agreement that is capable of verification. And you know the feeling of our country and the feeling in the Senate with respect to verification. We simply are not willing to enter into an agreement that cannot be verified.

If I may digress for just a moment, I was one of those who took the lead in the debate in trying to bring about the limited test ban agreement, but I opposed stopping underground tests because we could not verify them. This runs very deep in the American system.

U.S. RETALIATORY CAPACITY SUFFICIENT

In my view, our retaliatory capacity is clearly sufficient to permit us to seize this opportunity without imperiling the security of our Nation and, indeed, it is my firm belief that unless we do seize this opportunity we will be increasing our peril.

I thank you gentlemen of my committee for listening.
(Full text of statement follows:)

STATEMENT BY SENATOR ALBERT GORE, CHAIRMAN, SUBCOMMITTEE ON INTERNATIONAL ORGANIZATION AND DISARMAMENT AFFAIRS

Last week, I described the antiballistic missile system as a weapons system in search of a mission. Since the hearings last week I have continued to study carefully the plans announced by the Defense Department for both offensive and defensive nuclear weapons. National decisions on matters of such importance should be made in the light of maximum public understanding of the issues involved. To contribute to such public understanding, I have had prepared a series of charts which reflect the current status of the nuclear arms race and some of the implications of the escalation that is being proposed. The charts are based on information supplied by the Department of Defense in various posture statements and in its presentation of the ABM issue.

Chart I reflects the situation today. The United States has enough nuclear weapons to attack about 2400 different targets. The Soviet Union can attack about 1100 different targets. In all categories of weapons, the United States is ahead. Submarine launched missiles are shown on the bottom of the bar, land-based missiles in the middle, and bombs carried by bombers on the top.

How much is needed to establish a credible deterrent is a political judgment as well as a military judgment. For the purpose of this chart, it is assumed that the capacity to destroy the 50 largest cities in the Soviet Union and in the United States would be sufficient on the part of either effectively to destroy the other. Allowing for possible unreliabiliy or inaccuracy, 250 Soviet warheads are allocated for this purpose, and the red line reflects the portion of the Soviet Union's capacity that would be required.

Similarly, on the right side of the chart 250 warheads are allocated for use by the United States against the 50 Soviet cities. Thus the red line in each column reflects the number of warheads required to attack 50 cities in the other country, and the portion of the columns above the red lines reflects the enormous number of weapons each country has in excess of this requirement.

The United States has a larger "overkill" capacity than the Soviet Union, but the power of each country is so great that the difference is relatively unimportant. Each side has a "sufficiency."

Chart 2 reflects the fact that the United States has 48 strategic weapons for each of the 50 largest Soviet cities. The Soviet Union has 22 nuclear weapons for each of the 50 largest U.S. cities. Neither this chart nor Chart 1 includes our 7,000 tactical nuclear weapons in Western Europe, many of which could reach parts of the Soviet Union.

The Department of Defense plans to deploy separately targetable warheads on our missiles. These warheads can be guided to separate targets although launched on the same missile launcher, as shown in Chart 3. This system is called MIRV. If MIRV is deployed, our submarine based missiles will be able to attack up to ten targets each or perhaps even more. Our land-based missiles will be able to attack three targets each. Thus, if this plan is fully implemented, the United States will be able to attack about 8,000 targets. This is an increase of six thousand or four times as many as our current capability.

Chart 4 shows the escalation of our nuclear capacity resulting from full deployment of MIRV. On the left are the weapons we have now. On the right are the weapons we would have after deployment of MIRV. A double-size chart is required to show the 1974 capability.

Indeed, if MIRV is deployed, it will become more difficult for either side to know how many warheads the other has! The number of warheads resting on each missile launcher can be changed from three to five or ten or even more. This will complicate any future arms agreement by making verification very difficult on each side.

We can expect the Soviets to react to our decision to deploy MIRV by acquiring more warheads to match our escalation.

On the left of Chart 5, we see how many targets the Soviet Union can attack with warheads the Defense Deparment says it now has. Let us assume that the Soviet land and sea based forces grow at the rate reflected in the Defense Department charts. The column on the right shows how many targets the Soviet Union could attack in 1974 if it also developed its version of MIRV and continued its buildup at the present rate. A double-size chart is also required here.

Our buildup and the Soviet buildup illustrate the action and reaction phenomenon of which Secretary McNamara warned.

Now let us speak about antiballistic missile defense. One of the Department of Defense charts assumes that the Soviet Union will continue to build nuclear missile submarines at the rate projected by the Department. In his presentation, Secretary Packard stated that if this occurs, the Safeguard missile system should not be limited to two defense sites in Montana and North Dakota, but that a complete twelve-site defense system will be deployed to protect our bomber bases.

Surely we cannot expect the Soviet Union to stop with one or two Polaris-type submarines, when we already have 41, and when we continue to go forward on the basis of our announced plans. Therefore, we must consider the overwhelming probability that at least one of the contingencies prescribed for Safeguard ABM expansion will occur. Thus, what is really being proposed by the Department of Defense is the complete twelve site ABM system. If the President's "option" is conditioned upon the Soviet Union discontinuing its buildup, he will really have no option.

Now if we begin the deployment of such an ABM system as the Department proposes, the Soviets will likely decide that they also must have an ABM system to cover their entire country, not just Moscow. If we assume that the Soviets deploy an ABM system with 1,000 interceptor missiles, we would have to assume that it might work. If it did, they could shoot down the first 1,000 incoming missiles. If the Soviets possess this capability, we would need at least 1,000 additional missiles for the task of destroying 50 cities beyond what we would need if they did not have such a system. Actually, we would probably assess our additional need at more than 1,000 warheads, since some of our weapons might not work.

Indeed, both sides would keep secret the number of their interceptors. Each would fear that the other had more interceptors than are known, and each would therefore feel compelled to deploy still more offensive missiles. Meanwhile, each would probably deploy more interceptor missiles just to maintain a margin of safety. If the arms race continued to escalate in this way, we could have a situation like that portrayed on Chart 6.

With each side building ever bigger ABM systems, the number of warheads needed to insure the capacity to devastate 50 cities steadily increases. The red lines move up. The margin of overkill or safety, however, becomes relatively lower. Neither side achieves anything in the way of enhanced security. This is an arms race in action. On chart number 6, the red lines have been placed at an arbitrary position on the chart. Just where the red lines might be would depend upon the number of interceptor missiles deployed by each. For example, if 2,500 interceptors are deployed, and if two offensive missiles are targeted to each, then 5,000 missiles would be required to deal with the defense. If more interceptor missiles are deployed, the red lines would have to be moved higher. The point is that the inevitable action-reaction cycle of an arms race would assure that eventually the red lines would move up proportionately in each case.

I have prepared these charts to illustrate what happens when both we and our major nuclear adversary each seek to counter the move of the other in what I regard as a senseless arms race that poses potential disaster for the world.

In my view, it would clearly be in the interest of our national security to defer the deployment of ABM and to seek promptly negotiations with the Soviet Union, before time runs out. After another cycle of action and reaction, there may well be no possibility of negotiating an agreement that is capable of verification. In my view, our retaliatory capacity is clearly sufficient to permit us to seize this opportunity without imperiling the security of this nation.

ABM DEFENSE OF CITIES

Mr. PACKARD. May I have just a moment to make a comment?

I must say that I am very pleased to know that you and I have come to the same conclusion on this matter—that an ABM defense of our cities makes no sense, and that it is the kind of a thing that does lead to escalation of the arms race. That is one of the first conclusions I came to after getting into the study of this matter. That is why I have recommended a different course—the course of protecting our retalia-

tory capability rather than protecting our cities. I agree with you that an ABM around our cities would tend to do the things that you have indicated here.

There are a few problems in the calculations because you realize that a missile has the same payload capability regardless of how many warheads it carries. So as you increase the number of warheads in a MIRV configuration you would reduce the power of those warheads accordingly. So you do not quite get the multiplication factor that you have shown here.

But I would be very glad to have the calculations made on the best information we have if you would like to see how the relation between MIRV and warhead size and payload works out.

But I would not disagree with the point you made about a city-oriented ABM. It coincides exactly with the conclusion I came to in this study.

I think you have to look at this ABM in terms of what we are proposing to do with it. We are proposing to protect our retaliatory capabilities so we do not have to build any more missiles, and we hope that the Soviets do not have to build any more missiles. I think if we can both come to the conclusion that a protection of our deterrent is the right objective for stabilizing this horrible situation that is what we would like to do.

I do not think you and I really disagree on the objectives here, and I assure you that in looking at this problem I have taken this matter into account.

UNITED STATES HAS SUFFICIENT DETERRENTS AGAINST AN ATTACK

Senator GORE. Well, Mr. Secretary, I suppose we fundamentally disagree on two things: I think if it is possible to have a sufficient deterrent to prevent an attack upon the United States, we now have it. And you said in your own statement, "I believe that our Navy will keep ahead of the Soviets." That is your statement.

I do, too, and we have such a capacity over and beyond all the Minutemen, not just a few of them. We have such a capacity to retaliate with utter destruction, that a further escalation of the arms race is not necessary to preserve our deterrents. We have an overkill now so enormous we can destroy each of Russia's 50 largest cities 48 times. How many times must you be able to destroy a nation to have sufficient deterrents to prevent her from starting an attack upon you?

All you propose to protect is this portion of our Minutemen. All this other would be unaffected by ABM, phase I.

Mr. PACKARD. Well, the only comment I would make, I judge you have not included any MIRVs or the ICBMs in this last one.

In any case, Mr. Chairman, I do not disagree with the general trend of this discussion, but the calculations in terms of how much you gain by MIRVs and what the relative importance of that is, is I think a little more complex. I would be glad to provide some additional information on it.

Senator GORE. I said to the Secretary the other day "If you calculate our completion of the MIRV program, then what you propose to protect, so to speak, would be less than 3 percent of our deterrent

force," and I just do not think that is necessary when we have, when we will have 6,000 missiles in submarines, and you say yourself that our Navy will stay ahead of the Soviets.

NATURE OF DEFENSE DEPARTMENT REVIEW

Senator FULBRIGHT. Mr. Chairman, there are a few questions I would like to ask.

I would return, Mr. Secretary, to the first question about this review. I think it would be very interesting to have before the subcommittee just who participated in the review and how, and in what depth it was made. The reason that particularly appeals to me is that this committee has done some reviewing, too, with some of the leading authorities in the field of nuclear warfare.

I think it would be interesting, in view of the fact that this subcommittee has gone into depth with some of the best brains in the country—acknowledged long before we got into this matter—such as Dr. York, Dr. Kistiakowsky, and the others—I think we and the public ought to be able to compare the nature of this review, if you wish to give it now, or tell us a little bit more about the review which you say you participated in.

Mr. PACKARD. Senator Fulbright, I will be glad to tell you something about the review.

It is my experience that when you look at a technical problem in terms of building a piece of hardware, whether it be a particular device or a weapons system, there are two or three very important considerations which should be taken into account. The first consideration is whether the proposed system is being built on sound scientific principles, and it is for this reason that it is important to obtain the advice of competent scientists, to make sure you have not violated some fundamental scientific principle. I have gone over what I consider to be the basic scientific principles involved in this program. It was my conclusion, after looking at the proposed system, that this is primarily an engineering problem and not a scientific problem, and I have dealt with such problems for a long time.

I found when you are dealing with scientists sometimes you have one of one view and another with a different view. But I do not have any disagreement with the comments that your scientific people have made on the scientific principles they have talked about.

Now, there may be other reasons why they are opposed to this program, and I have no disagreement with their right to be against the program. But I have not seen any facts brought out which would cause me to have concern about the basic underlying scientific principles of this system.

WERE INDEPENDENT VIEWS SOUGHT?

Senator FULBRIGHT. I do not believe that is relevant to who was involved in your review of this whole matter, who and when, and is it in process? What was the procedure?

When I raised this question last year about the ABM on the Senate floor, the chairman of the Armed Services Committee said they had no witnesses or testimony from any persons other than those employed or closely associated with the Defense Department.

In your review, did you go outside and employ any independent people to analyze the feasibility and advisability, the wisdom of this program?

I though I made it clear I would like to know what was the nature of the review and who participated in it. Did you make it alone, for example? Did anyone else make it?

Mr. PACKARD. The review utilized the full staff of the Defense Department, and those people that the Department had utilized for scientific evaluation.

In addition, to that, I have talked to some scientific people on my own about the matter, some people who have no connection with the——

WHO WAS INVOLVED IN REVIEW?

Senator FULBRIGHT. Who were they who had no connection with the Pentagon? There is nothing classified or secret about this sort of thing; is there?

Mr. PACKARD. One of the men that I talked to, I have a very high regard for, is Professor Panofsky.

Senator FULBRIGHT. Who?

Mr. PACKARD. Professor Panofsky. He is from Stanford. He is involved in the high energy physics programs.

There are several other people.

Senator FULBRIGHT. You have no reluctance to mention their names have you?

Mr. PACKARD. I am convinced that all of these scientific matters have been checked by competent scientists, and I would be very glad to provide a list of the people who were utilized for background information on this matter.

Senator FULBRIGHT. Is this professor the only one you wish to name whom you consulted outside of the Pentagon?

Mr. PACKARD. In looking at this problem, Senator Fulbright, I again concluded that this is an engineering problem; there were no uncertain scientific aspects involved.

Senator FULBRIGHT. Well, then, is the answer that you did not consult anyone else other than this man?

Mr. PACKARD. No, the answer is I did talk to some people on the outside.

Senator FULBRIGHT. Well——

Mr. PACKARD. I will be glad to give you the names of the people if you would like to have them.

Senator FULBRIGHT. Yes, I am asking you for them. There is no reluctance, no reason why you should not give them, is there?

Mr. PACKARD. No, of course not.

Senator FULBRIGHT. Go ahead and give them.

Mr. PACKARD. I will have to go back and check the list of the names.

Senator FULBRIGHT. You mean you do not remember them right now? You would like to check them? That is all right.

Senator GORE. Could we get a little more identification?

Senator FULBRIGHT. He is from Stanford. The reporter has it. How do you spell it?

Mr. PACKARD. P-a-n-o-f-s-k-y, I believe.

Senator GORE. Do you know if he would be willing to testify?

Mr. PACKARD. I think Dr. Foster is getting for you a list of the people who would be willing to testify. I do not know whether his name is or is not included on that list.

Senator FULBRIGHT. The Secretary gave us a list the other day, and I suggested that we select three out of that list. I do not know whether we have done that or not. You remember, three from those recommended by the Secretary.

If you did not consult any other scientists, did you consult any engineers outside of the Defense Department?

Mr. PACKARD. Senator Fulbright, I do not consider that when you are involved with scientific matters it is important whether you have people outside the Defense Department or not. Scientists, to me, are objective about such matters.

Senator FULBRIGHT. I am not trying to criticize you. My own purpose, as so eloquently described in this morning's editorial in the Post is to elicit some facts about this matter. I am not trying to say you should or should not. I am trying to find out if you did and what actually happened. This does interest us because this same Defense Department only a brief time ago was in support of the Sentinal program. Therefore, it is curious to me, and I think to others, that within such a short space of time the same organization, with enormous talent and resources, could so completely change its views about what is in the interests of our country.

(The list referred to follows:)

LIST OF SCIENTISTS AND ENGINEERS CONSULTED BY DR. FOSTER ON ABM

Members of Defense Science Board

Dr. Harold M. Agnew
Dr. Arthur T. Biehl
Dr. Lewis M. Branscomb
Mr. Daniel J. Fink
Dr. Eugene G. Fubini
Dr. Richard L. Garwin
Dr. Charles M. Herzfeld
Dr. Albert L. Latter
Dr. Richard Latter
Dr. George J. F. MacDonald
Dr. William G. McMillan
Dr. Frederick Seitz
Dr. Albert D. Wheelon

Members of Defense Science Board Task Force on ABM (Non-Board Members)

Dr. Roland Herbst
Mr. Fred Payne
Dr. Donald Ling

List of Members of the President's Scientific Advisory Council Present at Discussion of ABM with Dr. John S. Foster, Jr.

Lee A. DuBridge
Ivan L. Bennett, Jr.
Lewis M. Branscomb
Detlov W. Bronk
Sidney D. Drell
Michael Ference, Jr.
James C. Fletcher
Richard L. Garwin
Marvin L. Goldberger
Donald F. Hornig
Gordon J. F. MacDonald
George E. Pake
I. I. Rabi
Frederick Seitz
Herbert A. Simon
Charles H. Townes
Lewis Thomas
Charles T. Slichter
Frank H. Westheimer
Jerome B. Wiesner
Harland G. Wood

[Committee note: This meeting was held on March 17, although the decision to proceed with the Safeguard was announced on March 14.]

TIME ELEMENT IN USE OF ABM MISSILE

Senator FULBRIGHT. Now, there is one specific point that interested me. Someone brought up earlier the question of the time element in the use of these missiles in the ABM.

Do you know who Dr. Herbert York is?

Mr. PACKARD. Yes.

Senator FULBRIGHT. I believe he is from California, your home State. I think his credentials are as good as anybody's could be in this field. He was the Director of Defense Research and Engineering under Secretaries McNamara, Gates, and McElroy in the Department of Defense. He was a member of President Eisenhower's Scientific Advisory Committee then under the Chairmanship of Dr. James Killian. He is a very distinguished man.

When he was before the subcommittee he was very specific on this question, directly contrary, I believe, to what you are saying about the time element. He questioned the time being so difficult for the radar to analyze and determine just what kind of a missile it is, how fast it is going, what its direction is, all of this sort of thing, and then make up its mind as to whether it wishes to project this missile or not, whether there is time for the President or anyone else to intervene. I would say a fair analysis is that there would not be time to refer this to the President unless he was sitting right there, and he is not likely to be sitting at his radar center.

But this is what he said:

> Thus, the trigger of any ABM, unlike the trigger of the ICBM's and Polarises must be continuously sensitive and ready, in short, a "hair trigger," for indefinitely long periods of time.
>
> On the other hand, it is obvious that we cannot afford to have an ABM fire by mistake or in response to a false alarm, and, indeed, the Army has recently gone to some pains to assure residents of areas near proposed Sentinel sites, that it has imposed design requirements which will insure against the accidental launching of one missile and the subsequent detonation of the nuclear warhead it carries. These two requirements, a higher trigger, so that it can cope with a surprise attack, and a "stiff trigger" so that it will never go off accidentally are, I believe, contradictory requirements.

And then he goes on. I think that is significant, and I think it is significant to have a man of his stature analyze that particular question in such a directly opposite manner from what was explained this morning.

(The complete statement referred to follows:)

(Excerpt from Dr. York's testimony on March 11, 1969)

TECHNICAL DETAILS OF PROPOSED ABM SYSTEM

Last week's testimony before this committee described the Nike-Zeus and Nike X systems and the problems their designers faced in attempting to find a way of coping with the Soviet offensive capability. The complex technical details of the situation were outlined than and supported the generally accepted conclusion that it is hopeless to attempt to defend against a sophisticated and determined offense. Last week's testimony went on to indicate how, after this fact was generally accepted, the promoters of the ABM proposed the Sentinel system for the purpose of countering an attack by Chinese missiles. Such an attack is supposed to consist of fewer and less sophisticated missiles and thus presents a simpler problem to solve. The problems created by decoys and other penetration aids are solved by defining them out of existence, and a cheaper area defense system becomes possible in theory. Serious consideration is also being given to a hard-point defense system in which the defense would intercept only those objects actually aiming at certain specific very small target areas such as those centered on hardened missile sites and command centers.

The problems of penetration aid devices and tactics are again absent by definition, and the resulting problem, in truth I believe, becomes even easier to solve theoretically than in the case of the hypothetical Chinese missile attack. It is important to note, though, that in this hard-point defense case, entirely different

defense methods, which cannot be used to defend cities or large areas, also becomes feasible. Such approaches include mobility—as in Polaris and Poseidon—deployment of greater numbers of offensive missiles, and various deception devices and tactics such as providing more missile silo targets than there are missiles, and then playing a sort of shell game with the missile themselves. Thus, it is precisely in the case where an ABM-type defense becomes easiest that numbers of alternative technical defense schemes also become possible. Furthermore, and again because the problem as given is easier, it is quite safe to postpone any decision to deploy an ABM at least until after present attempts to get new arms control negotiations moving.

CAPABILITY OF DEFENSE SYSTEM DOUBTED

I should like now to turn to a technical problem that pertains to all the forms of ABM so far proposed, but which unfortunately is not so simple to discuss nor so easy to quantify as those brought to your attention last week.

Any active defense system such as the ABM must sit in readiness for 2 or 4 or 8 years and then fire at the precisely correct second following a warning time of only a few minutes. This warning time is so short that systems designers usually attempt to eliminate human decisionmakers, even at low command levels, from the decisionmaking system. Further, the precision needed for the firing time is so fine that machines must be used to choose the precise instant of firing no matter how the decision to fire is made. In the case of offensive missiles the situation is different in an essential way: Although maintaining readiness throughout a long, indefinite period is necessary, the moment of firing is not so precisely controlled in general and, hence human decisionmakers, including even those at high levels, can be permitted to play a part in the decisionmaking process. Thus, the trigger of any ABM, unlike the trigger of the ICBMs and Polarises, must be continuously sensitive and ready, in short a "hair trigger," for indefinitely long periods of time.

On the other hand, it is obvious that we cannot afford to have an ABM fire by mistake or in response to a false alarm, and, indeed, the Army has recently gone to some pains to assure residents of areas near proposed Sentinel sites, that it has imposed design requirements which will insure against the accidental launching of the missile and the subsuquent detonation of the nuclear warhead it carries. These two requirements, a hair trigger so that it can cope with a surprise attack and a "stiff trigger" so that it will never go off accidentally are, I believe, contradictory requirements. This problem exists only in the real world and not on the test range; on the test range there need be no such concern about accidental misfires, the interceptions do not involve the use of nuclear weapons and the day, if not the second, of the mock attack is known.

Another essential—but again difficult to quantify—difference between the real world and the test range lies in the fact that the deployed defensive equipment will, normally, never have been fully exercised and even the supposedly identical test range equipment will never have been tested against the precise target or targets that the deployed equipment would ultimately have to face. In the case of other defense systems which do work after a fashion, practice using the actual deployed equipment against real targets has been possible and has been a major element in increasing their effectiveness. Thus, the Soviet SAMs in North Vietnam work as well as they do because both the equipment designers and the operating crews have had plenty of opportunities to practice against U.S. targets equipped with real countermeasures and employing real tactics.

For these and similar reasons, as well as because of the technical problems detailed for you last week. I continued to have the gravest doubts as to the capability of any ABM system I have heard of, whether or not the problem has been defined into being "easy" and whether or not it "works" on a test range. I am not here talking about some percentage failure inherent in the mathematical distribution of its distances, nor statistically predictable failures in system components but, rather, about catastrophic failure in which at the moment of truth either nothing happens at all, or all interceptions fail.

Senator FULBRIGHT. Now, it is true it is a matter of judgment. I do not suppose Dr. York is infallible. I think he has had a very distinguished career, and in no way under the direction of the Pentagon. He was once, but he is now quite free to make his independent judgment.

Now, I do not reflect upon anybody in the Pentagon. The same thing happens to Senators. We are subject to the influence of our constituents, too, and everybody has somebody to whom he owes allegiance. After all, your people owe your organization an allegiance.

DEPTH OF STUDY QUESTIONED

I raise this question which is so serious to the survival of this country and of the world that I do not think this decision ought to be based upon a very superficial review or study or whatever you want to call it. This is what we are all talking about.

Nobody, including the scientists, says that this should not be studied further. Research should go on. But to make a decision, in the face of article VI of the Nonproliferation Treaty, to deploy is an extremely serious matter. The coincidence of the timing of the announcement of the decision to proceed with this program, the day after the vote on the Nonproliferation Treaty raises very serious questions in our minds about the depth of the decision, the depth of the study, which led to the decision, whether or not it really was based upon the kind of research that we believe this matter warrants.

MISSILES ONLY PART OF COUNTRY'S CONCERN

It is not only these missiles. Many of us get the feeling that this is a little game all apart from the security of this country. I think that if we continue down this road, as illustrated by the Senator from Tennessee, that we will so drain this country of its resources, both human and financial, that there won't be anything worthwhile to protect.

We will have this enormous Maginot line all around us. We have spent enormous amounts of money on defense, while internally our country is suffering. One of the major disturbances started in Watts, which is in your State. It looks like similar problems are going to continue.

This is a serious matter, I think. I know your position; you would say that is not your affair. You have to look after security.

Well, this is very important, and there is a tendency for everybody to think about missiles apart from the country as a whole, and I am trying to bring it together and see if this makes any sense to you.

VIEWS OF OUTSIDE SCIENTISTS

Senator CASE. Would the Senator yield at that point?

Senator FULBRIGHT. Certainly, I yield.

I am just trying to be persuasive. I yield to the Senator.

Secretary CASE. Right along that line of inquiry, Mr. Chairman, it seems to me that since the Secretary has quite properly indicated that this will not move until authorization and appropriation of funds by the Congress, that while Congress is engaged in the necessary hearings and consideration of the question, there will be time for another review of this in depth, which might take into account the views of the many outside scientists we have heard. It might be appropriate to suggest that that kind of operation be done before Congress is asked to take this definitive new action.

Senator FULBRIGHT. Well, actually, I thought that was involved in Dr. Killian's suggestion. Dr. Killian, in effect, said there should be a very high level commission or board to consider this matter. He said this before the subcommittee. Dr. Killian is no mean individual; he is a very respected man in his field. It is exactly what I would recommend, and I was very disappointed that this was not the route the administration took.

It could have accepted that suggestion and done exactly what the Senator from New Jersey said.

Senator CASE. And no time would be lost.

REEVALUATION OF THE MATTER URGED

Senator FULBRIGHT. I do not think it would be. I was so concerned because I was under the impression that you were proceeding on the theory—and when I say "you" I mean the Government—that this program was already authorized. Several times in discussing this, as you will remember at the White House, the Secretary of Defense and others referred to the program "already approved by Congress"; several Congressmen said the program was already approved by Congress, is that not correct? That led me to the impression that you believed you had authority to proceed, and I thought you were going to, and I am very much relieved when you said this morning you are not going to proceed until we have both an appropriation and an authorization, so that does give us time.

So I am not really trying to criticize or push you. I am only trying to make the case for a reevaluation of this matter. That is what I am trying to do.

Mr. PACKARD. Senator Fulbright, I would just like a moment to respond. I do have a high regard for Dr. York, but I think if you will look at the record as I recall, he is the one who did not think the Polaris would work. All this merely says that the scientists have different views on things, and I think you have got to get down to the question of whether they are evaluating something on scientific principles or whether this is just sort of their judgment as to whether the model will or will not work. I would have no trouble at all with the fact that Dr. York did not agree with me.

(The following telegram was later received from Dr. York:)

UNIVERSITY OF CALIFORNIA,
San Diego, March 29, 1969.

Senator JOHN SHERMAN COOPER,
Senator ALBERT GORE,
Senate Office Building,
Washington, D.C.:

It has come to my attention that Secretary Packard in his testimony stated that I had opposed the deployment of the Polaris missile. He may have done this in order to cast doubt on my testimony concerning the ABM. The fact is that I always during my tenure with the Defense Department recommended positively to the Secretary of Defense concerning the development and deployment of the Polaris system.

HERBERT A. YORK.

Senator FULBRIGHT. Well, Dr. York certainly is concerned and he is not the only one, but I mentioned him because he had referred specifically to one matter of timing. Drs. Kistiakowsky, Killian, Rathjens, a more recent product of the Pentagon, and Wiesner, and

others, have more or less reached the same conclusion. I used the illustration of Dr. York only because he paid special attention to the timing question which had come up earlier.

Senator GORE. Mr. Chairman, would you yield there?

Senator FULBRIGHT. Yes.

Senator GORE. We might inquire if General Starbird was not the man who had charge of the McNamara line construction.

Senator FULBRIGHT. I do not know, but he certainly knows how to organize the public relations talents in the Pentagon and a lot of other people. I did not know he had that ability.

I feel much better about this matter now that I know we are going to have an opportunity for a proper consideration of it in the regular congressional procedure. I was under a misapprehension about it.

CONTROL OVER A FIRED WEAPON

You have answered a number of questions that I had but there is one aspect that still puzzles me very much about the question of the use of ICBMs, which you told us this morning can be controlled in their flight.

In other words, if there is a doubt in your mind whether the shooting or firing of a weapon is in error you can, in effect, destroy them by ceasing to direct them.

It seems to me that this does alter the argument that was made before, that once they were fired they were beyond recall.

If that is true that they can be controlled and it gives you this time, it seems to me the time element is about as sufficient as you would have in the use of ABMs if there is a massive attack.

An accident of this probability, it seems to me, is a matter stressing the need for negotiations in arms control, a need to come to an agreement and understanding with the Russians, and eventually, if they develop the capability, hopefully, with the Chinese. But that is so far in the future I do not think you can contemplate that. At the moment with Russia, it is a matter of arms control rather than an arms race.

If on the theory that there could be a single weapon accidently released by the Russians or a single one released by some madman, this is not sufficient reason to justify an ABM system. We should have some agreement about that in the matter of control.

If there is a massive attack about which there could be no mistake, then let me consider the use of the ABM as Senator Symington suggested. I do not think you have given a good answer to that yet.

Do you wish to comment a little further? Maybe you could enlighten us about the statement Senator Symington made earlier. It is very appealing to me.

Mr. PACKARD. Senator Fulbright, it is possible, of course, to provide a stop mechanism so that if you released all of your ICBMs you could probably disarm them in flight. [Subsequently, the Defense Department added the following sentence at this point: "As you probably know, our current Minutemen do not have such a stop mechanism."] But it seems to me you ought to go back now and think about whether you would like to have all of your ICBMs completely uncovered, if you go on this theory. According to that theory, you do not need to buy hardening for your Minuteman silos, you can leave them right out in the open.

But if you make a mistake when you fire them, you then have no more missiles, and it seems to me this is a very illogical position to take.

Senator FULBRIGHT. Are you likely to make a mistake about a massive attack? Is this, do you think, a probability?

Mr. PACKARD. It seems to me that it is sensible to provide some time for the President to judge the matter rather than having to release a thousand ICBMs when only the first one or two enemy ICBMs have come over.

Senator FULBRIGHT. I get the impression that the Pentagon is shifting its target all the time. I cannot quite come to grips with it.

You said a moment ago what you are interested in really is not what happened once a war started, but in preventing the war in the first place the deterrence.

REACTION OF RUSSIANS TO A DETERRENCE

Now, the probability that the ICBM would be released, but subject to recall, seems to me in the minds of the Russians would be a lot more of a deterrence than the existence of an ABM.

My mind works slowly but it appears to me, on the one hand, you say that we are looking for a deterrence that will discourage the Russians from releasing a weapon and, on the other hand, you say what will happen when they do release them, and then you shift.

If the objective is deterrence and you are not really concerned with the ABMs, fighting the war or whatever when an attack occurs, these are two different things. If the ABM is a deterrence, and you have said several times that it is, then I do not see that that is an answer to the idea that you release your ICBMs. It would really concern the Russians to know what you would really do if they sent over a massive attack.

Senator GORE. Or a light attack.

Senator FULBRIGHT. Or even a light attack, one that could be detected, if they are going to release their ICBMs. I would think that is the greatest deterrent you could have, and you are going to release ours before they are destroyed, and you could do it.

These are all ICBMs that can be released. I believe somebody said they could be fired in a minute. These are solid, at least part of them. I do not know how far you have gone along with solid fuel. They can be released in a few minutes; they can be fired in a short time.

Mr. PACKARD. Senator Fulbright, it seems to me that if the Congress and the President of the United States are satisfied to go to that sort of policy then indeed we could stop all of our hardening programs and leave our Minuteman unprotected. But I think this is a question that goes not to what I think, but rather to what the Congress and what the President think.

Senator FULBRIGHT. Well, it is very important what you think.

ICBM AS THE DETERRENT

Can you comment on the prospect that the ICBMs will be released? Do you believe that is a real deterrent to the Russians or is it not? That is the only question I was asking.

Mr. PACKARD. Senator Fulbright, I do not think that is a responsible kind of a deterrent. I think we need to have the opportunity for the President, the command authority of this country, to have some flexibility in what should be done.

Now, you can have a deterrent that works the way you suggest. That was what we had with the early Atlas program. If you want to go to that kind of a policy it can be done, but it does not seem to me to be a sensible procedure.

Senator FULBRIGHT. That is all I asked. You think what I said was illogical and makes no sense. But it seems to me it does.

If I were a Russian, that would deter me more than the idea that we could fire an ABM. As a matter of fact, the reason the Russians have not reacted more vigorously is they do not really think the ABM is going to work very effectively, and if it does not work very effectively, then you are very wrong to rely upon it just to give the President some further reaction time.

If you are going to rely on the ABM being perfect in protecting these sites, you have a great deal more confidence in it than has anybody who appeared before our subcommittee except, with the one possibility of Dr. Fink who, I believe, works for one of the contractors.

The Chairman suggests I read this. This is your statement this morning:

"There is general agreement on what is necessary to deter a deliberate attack. We need to assure the potential aggressor that if he strikes us he will receive a retaliatory blow which will destroy him as a nation. We need the weapons to make good on that assurance. We must make clear that we have the ability and the will to use the weapons when they are needed."

In accordance with that statement, it would seem to me the assurance, the knowledge, that these ICBMs, even part of them, would be released immediately without any fiddling around about it, even without asking the computer what to do, would be the greatest deterrence in the world.

RELYING ON AUTOMATIC COMPUTER

I do not approve of the idea of relying on automatic computers. But if I understand some of the testimony, that is virtually all you could do. How could you consult the President? Where would he likely be and how could you consult him, even if he had the black box with him, and describe to him, convey the whole picture within 5 minutes or so? This is a terrific decision to put on him, and he might be a little hesitant to make it. But anyway, that is another matter.

FURTHER STUDY IS REQUIRED

I won't delay any longer. I referred a moment ago to an editorial, for example, and I think it is pertinent, in justification of this hearing. It says:

"Perhaps we misconceive the purpose of a 'posture statement' or even that of a Secretary of Defense. If so, it is all the more incumbent upon Senate committees currently studying our armament needs to balance out this presentation, so to speak; when billions of dollars and the Nation's security are being discussed, live and in color, the

public is entitled to hear other witnesses, with other perspectives about a different world than the one portrayed by Melvin Laird."

That is what I think is correct. We are proceeding the best way we know, and that is the only reason we are asking these questions. I certainly am not trying to criticize you. I know you did not make these decisions alone, but they are decisions all of us must participate in.

Since the posture meetings, of Secretary Clifford was as late, as you know, as January, a great question is still in my mind as to the reasons for this shift, the validity of it, how seriously the matter was studied, and whether or not it does not require much further study before we are faced with the decision of authorizing the program and appropriating the money.

Thank you very much, Mr. Chairman.

(The editorial referred to follows:)

[From The Washington Post, Mar. 26, 1969]

THE WORLD OF MELVIN LAIRD REVISITED

We return, reluctantly but compulsively, to the world of Melvin Laird (and David Packard, to be quite fair about it), to the Defense Secretary's annual "posture statement," to the testimony of the Pentagon's two top civilians before the Senate, and specifically, like a moth to a flame, to Mr. Laird's apocalyptic estimate that "never have the challenges of our National Security exceeded in number and gravity those which we found upon taking office."

There is something about this and other rhetoric in the "posture statement," something about the tone as well as the content, that makes it sound like a senior thesis, written, one might surmise, almost wholly on the basis of an intensive interview with the Joint Chiefs of Staff. Tasks are "monumental," threats are "grave," challenges are of "serious import." The incomprehensible jargon of the professional military man is passed along by a civilian Defense Secretary as if it were the stuff that Senators, not to mention ordinary folk, deal in every day ("The Soviets may configure their SLBM's for depressed trajectory launch"). And there is, finally, the mark of the deeply partisan politician, and the former Congressman, self-conscious about his new position on the other side of the table, defensive about the "tremendous and complex problems" he inherited, gratuitous in his effort to downgrade his Democratic predecessors for the organizational and functional shambles these supposed efficiency experts left behind them.

The move from the relative obscurity of a "posture statement" to the public stage of a televised Senate committee hearing had something less than a sobering effect. As the going, and the questioning got rougher, the Secretary got tougher and the world of Melvin Laird became a still less congenial place. For example, the details of the new Soviet SS9 supermissile, which apparently was not thought to be a proper subject to include in a formal "posture statement" were abruptly declassified and trotted out as Exhibit A in the case for Soviet aggressiveness as it was presented live for all to see and hear. By this time, with the ABM selling sluggishly, it was apparently thought necessary to state as a simple fact that the Soviets were beyond a doubt moving to a first strike capability with the potential wherewithal to knock out substantially all of our 1000 Minuteman missiles, which comprise a significant part of our retaliatory force.

All this may be true, of course, or at least the military experts at the Pentagon may sincerely believe it to be true—that this country has never been more gravely menaced, that the Russians are embarking on a recklessly provocative new nuclear strategy, that Communist China "still constitutes the most dangerous potential for threatening the peace in Asia." In any case, there is nothing wrong with military men taking the darkest possible view of things in the interest of eternal vigilance. We pay them to be prepared to defend us and they deserve better than to be assailed or ridiculed for their preoccupation with the intricacies and complexities of a level and a form of warfare which most of us find almost impossible to contemplate, let alone countenance.

But we also pay civilian leaders in the Defense Department to weigh the always exorbitant demands of the military against other evidence—political estimates of realistic enemy intentions, for example—in reaching some measure

of our needs which can be reconciled with our other priorities. And that is what is so disquieting about what we have been listening to the past week or so; there is no sign that the anxieties of the military about the theoretical *potential* of our adversaries has been balanced off against the political realities as assessed by the Kremlinologists and the Sinologists. The opinion of MACV in Saigon is recorded, but not that of the many civilian experts who are known to have a different view. The dire projections of the Joint Chiefs are faithfully set forth. But where is the indication that other views have even been heard—the dissents of a John Fairbanks on Red China's aggressive intents, for instance, or the thinking of a Llewelyn Thompson or a Charles E. Bohlen on the nature of the long-range Soviet threat. When, for that matter, are we to hear what one would take to be the view of the President himself on the prospects for constructive negotiations with the Soviets.

Perhaps we misconceive the purpose of a "posture statement" or even that of a Secretary of Defense. If so, it is all the more incumbent upon the Senate committees currently studying our armament needs to balance out this presentation, so to speak; when billions of dollars and the Nation's security are being discussed live and in color, the public is entitled to hear other witnesses, with other perspectives about a different world than the one portrayed by Melvin Laird.

Senator GORE. Senator Javits.

Senator JAVITS. Mr. Chairman, I realize the time is late, but I have one line of questioning I would like to pursue briefly.

DEVELOPMENT OF MIRV SYSTEM

I would be obliged to the Secretary if he could bear with me. I think one of the key questions here, Mr. Secretary, is: does this action represent a new initiative by the United States which will, in turn, involve a new initiative by the Soviet Union? And in that regard, I think the experience with MIRV is a very relevant consideration.

Now, I note in your statement you say with respect to the hedges against the failure of our deterrent:

"For instance, we have added to the numbers of our deterrent weapons so that through sheer quantity alone we will be certain that a sufficient number will survive an enemy attack, that a sufficient number of these surviving missiles will be launched successfully," and this is the important statement, "that a sufficient number will penetrate an anticipated enemy's defenses * * *"

Is it or is it not a fact that the MIRV system began to be developed as soon as we had reliable information that the Russians were deploying an anti-ballistic missile system around at least one of their cities?

Mr. PACKARD. Senator Javits, I cannot go back and determine what the actual basis of the decision was for the MIRV program, but I will say this. [Subsequently, the Defense Department amended the beginning of this sentence to read: "Senator Javits, the MIRV R. & D. program was begun before the Soviets began to deploy an ABM However,"] as I tried to convey in my opening statement, the deployment of an antiballistic missile system around the cities is something which does tend to encourage the enemy to react, and the reaction that is logical is to add many smaller multiple warheads because this makes it more difficult for the ABM system to provide protection. You do not need large warheads to inflict destruction on cities. You can have a number of small ones, and if a few of the small ones get through, the damage is serious.

It was, in my opinion, a very important consideration that we not give the Russians any indication that we were deploying an ABM system around cities because this move would encourage them to go to

some sort of a MIRV program. And while, as I say, I cannot be sure of what the reason for the undertaking of the MIRV in this country was, I understand there was some research and development going on before the Russians began to deploy their ABM, and the fact it was deployed around cities was the kind of deployment which would justify or encourage a move toward a multiple warhead weapon. [Subsequently, the Defense Department amended this sentence to read as follows: "As I indicated, we had some research and development on MIRV going on before the Russians began to deploy their ABM, and the fact that they deployed it around Moscow was what encouraged us to move toward multiple warhead weapons."]

ACCELERATING THE ARMS RACE

Senator JAVITS. Now, the big thing that has come out in these hearings, the big new thing, which has been widely advertised, is the fact that our knowledge about the SS–9 has been revealed.

Now, again, is not the SS–9 obviously, in turn, the Soviet Union's riposte to our MIRV development? In other words, are we not witnessing here that every time we take a step or every time they take a step, there is a correlative step accelerating the arms race and that, therefore, there is a great advantage in having one of the parties at some point when they are reasonably secure, if even only for 6 months or a year, saying, "This is it. We are ready to stop now, give or take 10 percent on whether we are fully protected or you are fully protected, we are willing to stop here."

Are we not, by undertaking to get this new system turning away from the Sentinel to Safeguard, although that is quite a logistical trick, too, as I see it by the new administration, just saying to the Russians, "OK, now we have thrown our bid on the table: now meet it," and this goes on and on until you have automaticity in the end? That is what is deeply troubling at least one Senator, and I think my colleagues, as well.

Senator GORE. Would you yield there?

Senator JAVITS. Yes.

MIRV AS A REACTION TO SOVIET ABM

Senator GORE. I would just want to read to you, Senator Javits, in connection with this very incisive interrogation you are conducting, Dr. Foster's testimony before a Senate Subcommittee November 6 and 7, 1967. Here is what he said about why we were developing MIRV:

"In formulating our plans for the development and subsequent deployment of systems in the mid and late 1970 s, we have to be sure that the system then in being will be able to cope with the Soviet ballistic missile defense, Soviet ABM.

"Now, clearly there are a number of ways to attempt to defeat ballistic missile defense. In truth, we use all of the ones that seem to make good sense. We do use chaff and decoys and electronic jammers, all manner of things, but a number of these cannot be said to be of high confidence. That is to say, the enemy may in that time be able to figure out a way in order to find a reentry vehicle that you have among the chaff, and so the chaff would not disturb him, and he would be able to deal with the reentry vehicle.

"So we have tended to go to one other measure, and that is a very conservative measure, the use of multiple reentry vehicles. These are many different separately aimed warheads in reentry vehicles, each of which is capable of causing enormous destruction, each of which then must be engaged by the defender."

This was before an Atomic Energy Committee subcommittee. So, you see, what you say about the action-reaction cycle is portrayed by Dr. Foster's own words.

Senator JAVITS. Thank you very much, Mr. Chairman. That is very helpful.

Do you wish to comment on that, Mr. Secretary?

Mr. PACKARD. Yes, I would like to comment because I think we have to be very clear in separating the problem of the defense of the cities through the deployment of an anti-ballistic missile system around cities, and the problem involved in the defense of so-called hardened targets.

There is no question that the appropriate response to the ABM defense of cities is a large number of small multiple warheads. This does not work anywhere near as effectively if you are trying to attack hardened targets, because you have to have both substantial yields and high accuracy. After reviewing this problem very carefully, it was my judgment that it was the SS–9, with the three warheads which they are developing, that will give them the capability of attacking our Minuteman silos. The use of their other smaller missiles, even with MIRVs would not have any effect on that problem.

In other words, it seems to me that both we and the Soviets can get on with discussions on the basis that we have a, hopefully, stabilized level, and that our ABM is a part of our deterrent force and has no capability of attacking the other person first. This is what we ought to try to achieve, and this is the basis on which you could develop some viable arms control understandings.

ABM SYSTEM CONTINUES STEP IN ARMS ACCELERATION

Senator JAVITS. Mr. Secretary, but you are not going to develop this system *in vacuo*. You are developing this system side by side with the nearly developed MIRV. Therefore, cannot the Russians be just as suspicious of us that we are going to give them a double whammy? We have got MIRV with which can inundate their cities and be very hard to detect and now we are protecting outselves against their possible first strike capability of the SS–9 by undertaking this new system. There we are back again just exactly where we were before in terms of the acceleration. That is what we are arguing.

Mr. PACKARD. Well, Senator Javits, I think there is much less reason for the Soviets to react to a deployment designed to protect our retaliatory capability to a deployment designed to protect our cities. Again we have got to concentrate on deterrence, the avoidance of war, and it was this factor that was really at the forefront of my consideration in looking at this matter. I came to the conclusion that we should not go ahead with a deployment designed to defend cities; but should concentrate on stabilizing our deterrence at the present level and protecting it so we could be sure to have it through the 1970s. This sort of development should not cause the Russians to hesitate in any way in proceeding with arms talks with us, and I certainly hope they will do so.

RUSSIAN REACTION

Senator JAVITS. Mr. Secretary, is it not a fact that the same thing could be said by a fellow testifying in the Soviet Union, as you did, about Galosh. Why couldn't he have said, "Look, this is purely defensive, it is purely defensive, it is just protecting our cities. The Americans would have no right to react to that any more than we have reacted."

But we do not think that at all, but we are developing MIRV exactly as an answer to that situation, so why shouldn't they, why shouldn't they take their cue from us, having developed the SS–9, and take the next step after we take this one, whatever it may be?

Mr. PACKARD. Well, Senator Javits, if they had deployed their ABM in protection of their retaliatory capability, and not done anything that looked as though they might have the capability, whether intended or not, of making a first strike, I think we would have had a different reaction. I keep getting back to the point, as I see it, that if both we and the Russians could avoid taking those steps which would give either of us a possibility or the likelihood of undertaking a first strike, then we could have a stable situation. You have got to keep that first strike in mind, and there are two things, which tend to increase your ability for a first strike.

One is to deploy larger weapons that have high accuracy, because if you make a first strike you want to destroy the other fellow's retaliatory capability.

The other is to deploy your protection, whether it be ABM or shelters, so that you can protect yourself if you strike first and the other side retaliates. I have looked at this problem very carefully, and I have come squarely to the conclusion that this move of deploying Safeguard is not one against which the Russians should have any reason to react.

Senator JAVITS. I cannot see how they can do anything else. They have an SS–9 that we say can destroy our Minuteman. We preserve, therefore, the first-strike capability of our Minuteman by surrounding them with a new Safeguard system so their SS–9 is out the window and we have the first-strike capability again, so they have got to meet that card laid on the table.

Mr. PACKARD. Yes. But, Senator Javits, there is one critical point in your argument. We do not have a first-strike capability with our Minuteman. That is where the argument falls down. We do not have a first-strike capability with our Minuteman.

Senator JAVITS. Why?

Mr. PACKARD. They are not designed for that.

Senator JAVITS. Because we won't use it?

Mr. PACKARD. No, because they are not designed for that. They are designed for a second-strike capability, and whenever you put MIRVs on these Minutemen that makes them even more of a second-strike weapon, as I explained to you before.

MINUTEMAN AS A FIRST STRIKE WEAPON

Senator JAVITS. What is the reason that you say that the Minuteman is not a first strike capability weapon? It can be used for that, can it not? There is nothing to stop us from launching it. I mean, so

far as the Russians are concerned, they have to estimate with us as we estimate with them, the worst.

Mr. PACKARD. Senator Javits, some of the considerations involve estimates of accuracy and weapons size, and I would be very glad to go into that with you in detail. I cannot do it in open session.

Senator GORE. What about the Polaris?

Senator JAVITS. Of course, the Chairman says, what about the Polaris? Doesn't that have a perfectly untrammeled capability?

Mr. PACKARD. Again I look upon our total capability as oriented toward deterrence. I think it should remain oriented toward deterrence, and it was and still is when I looked at it. But it looked to me as though the Russians were developing a first strike capability, and that is when I became very concerned and concluded that this whole program should be changed to protect our deterrent.

Senator GORE. Would the Senator yield?

Mr. JAVITS. I yield.

U.S. CAPABILITY TO DESTROY SOVIET UNION

Senator GORE. It seems to me when we acknowledge the figures which you have in your budget presentation, 2,400 missiles, enough to target 48 on each one of the 50 largest Russian cities, ready to fire from the ocean, from the air, from the Minuteman silos, that we would have the capacity, God forbid, if we proposed to do so, to launch destruction on the Soviet Union.

Mr. PACKARD. Mr. Chairman, I have no concern about our present capability to deter the Russians. We have adequate capability now.

Senator GORE. Well, if I may use your own words——

Mr. PACKARD. We are talking about the mid-1970s.

Senator GORE. Excuse me, I know it. Senator Javits is talking about right now; he is talking about the present.

Senator JAVITS. This is the time to negotiate; now.

Senator GORE. And you say now you are concerned about deterrence. Well, Senator Fulbright just reread to you a statement this morning that our deterrence is the power to launch a destructive attack upon a potential enemy, so this is semantics. We are dancing on the head of a pin.

Of course, we have the capability to destroy the Soviet Union 40 times over, at least all her cities.

IS DEFENSE DEPARTMENT APPRAISAL BASED ON SECURITY CONSIDERATIONS?

Senator JAVITS. Mr. Secretary, one other thing I would like to ask you but, as I say, I apologize for delaying you at this point: Is it fair to say that the Defense Department's appraisal is placed strictly on hard security considerations, and that there is not present in its appraisal, whatever may be the gravamen of the President's decision, the kind of consideration which I have mentioned to you; to wit, that you are in a strong position or much stronger position to get an arms limitation agreement if at some point you say, "We stop here"? Is it fair to say as far as the Defense Department is concerned, Secretary

Laird says it is his job to maintain our security regardless, to the optimum extent that he can, that is what he is doing, and any other considerations, I would gather, would be up to us and the President.

Mr. PACKARD. Senator Javits, I think it is correct to say that the Defense Department's first responsibility is to make sure that we are strong, and if we are going to err, we should err on the side of strength.

But I assure you at the same time that we have to keep in mind that we are part of this country. We have a responsibility to consider the amount of money we are spending, and we are preparing budgets which are going to provide reductions from the previous budget, and also provide some funds to do the things that you people want to do.

To say that we should approach the job of building a defense for the country with unlimited access to the resources of the Federal Government is just not a good idea, and we do not intend to look at it that way.

Our job is to provide a strong and adequate defense of this country at the most reasonable cost we can achieve, and I assure you that is what I intend to work toward as long as I am here. I am recommending this ABM program as one that I think fits in with that policy. We have already done some other things to provide funds for some of these other needs of our country.

I do not consider that it is my responsibility to recommend a program regardless of the expense. We have got to think about the problems of our country while we are defending it, and I intend to continue to do that.

Senator JAVITS. So that you advise us that in its own estimates the Department of Defense has balanced the considerations of the cost and expenditure with the considerations of security, so even this is not the optimum security, is it, on that basis?

Mr. PACKARD. Senator Javits, we have tried to achieve a balance on this and we have tried to look at what could be the least costly move.

Now, I cannot assure you that our judgments are correct, but I can assure you that we have looked at this matter on a broad basis. We have looked at the technology, we have looked at these considerations involving first and second strikes, and they are complex and you get into very difficult considerations here. But again I emphasize that I think the Defense Department has the responsibility to provide adequate strength to meet the needs of the country. But it should not be an unlimited defense in terms of cost, and I do not think we are going to need to do that at any time.

JUSTIFICATION FOR A RESEARCH AND DEVELOPMENT PROGRAM

Senator JAVITS. Let me close by asking you this hypothetical question: Suppose the President had decided the other way. Suppose he had decided that we would stop now and go on just with research and development. Would the Defense Department have been able to make a case that this did not immediately jeopardize the security of the Nation?

Mr. PACKARD. This is difficult judgment, because one has to look at what might happen in 1974 and 1975.

I looked at this situation, and if we had proceeded with simply a research and development effort, our recommendations for the fiscal

year 1970 budget would have been in the neighborhood of $500 to $600 million or so. But we have recommended a minimum program to keep the ABM effort moving ahead toward achieving this phase I deployment, with full consideration of the fact that our country has other needs for funds, and with the full consideration that the most important objective in this whole strategic warfare problem is to achieve some kind of an arms limitation agreement. If I felt that this recommendation did, indeed, stand in the way of a satisfactory solution to this problem, I assure you I would not have recommended it.

Senator JAVITS. Well, I do not know that I can really press you to an answer to this question, but I asked a hypothetical question.

I rather think that if the President had decided the other way, they could have made just as effective a case for the country's security during this interim period in which negotiations have some possibility of success, as they are making now to sustain a different decision. It is just my own opinion.

Mr. PACKARD. Senator Javits, I think from what I see of the situation, the Defense Department would have certainly had to consider some other alternatives in the hypothetical case you suggest, such as accelerating the hardening of Minuteman silos. I think, though, as we have indicated on these charts, that this is a better course, and we decelerated some things in order to keep this in balance. I am not sure we would have saved any money if we had gone the other way.

Senator JAVITS. In other words, you would have embraced other alternatives.

Mr. PACKARD. There were other alternatives. We chose this alternative to provide a balanced deterrent. We could have gone to more Polaris boats. We looked at all of these other alternatives, we costed them out, and after looking at them and considering all of the factors involved, it was my conclusion that this was the preferable alternative for us to choose.

Senator JAVITS. Mr. Chairman, I thank you. I thank the Chair very much, and I thank the Secretary.

Senator GORE. Mr. Secretary the subcommittee is very grateful to you for your patience. You are very diligent; you are very able.

Is there something further you would wish to offer?

Mr. PACKARD. Thank you, Mr. Chairman.

I want to express my appreciation to you and the members of the committee for the opportunity to be here. I share with you the feeling that this is a very important issue, and I want to work with you to resolve it in the best interests of the country.

Senator GORE. Thank you very much.

The committee will be in session on Friday to hear Dr. Donald Brennan of the Hudson Institute, and Dr. George Rathjens of MIT.

The subcommittee is now adjourned.

(Thereupon, at 1:25 p.m., the hearing adjourned, to reconvene on Friday, March 28, 1969.)

STRATEGIC AND FOREIGN POLICY IMPLICATIONS OF ABM SYSTEMS

FRIDAY, MARCH 28, 1969

UNITED STATES SENATE,
SUBCOMMITTEE ON INTERNATIONAL ORGANIZATION
AND DISARMAMENT AFFAIRS OF THE
COMMITTEE ON FOREIGN RELATIONS,
Washington, D.C.

The subcommittee met, pursuant to recess, at 10:05 a.m., in room 4221, New Senate Office Building, Senator Albert Gore (chairman of the subcommittee) presiding.

Present: Senators Gore, Fulbright (chairman on the full committee), Symington, Pell, Case, and Aiken.

Also present: Representative Anderson of Tennessee.

Senator GORE. The subcommittee will come to order.

The subcommittee is pleased and honored to have three very distinguished accomplished scientists to appear this morning. All of them are personal acquaintances of mine. We will begin with Dr. Panofsky who has achieved fame in many respects.

You may proceed, Doctor.

(A biographic sketch follows:)

W. K. H. PANOFSKY, DIRECTOR, STANFORD LINEAR ACCELERATOR CENTER, PROFESSOR, SLAC

Degrees: 1938, A.B., Princeton University. 1942, Ph. D., California Institute of Technology. 1963, D. Sc. (Hon), Case Institute of Technology. 1964, D. Sc. (Hon), University of Saskatchewan.

Experience: 1942–3, Director, Office of Scientific Research and Development Project, California Institute of Technology, Pasadena. 1943–5, Consultant, Manhattan District, Los Alamos, New Mexico. 1945–6, Physicist. Radiation Laboratory, University of California at Berkeley. 1946–8, Assistant Professor of Physics, University of California at Berkeley. 1948–51, Associate Professor of Physics, University of California at Berkeley. 1951–63, Professor of Physics, Stanford University, 1953–61, Director, High-Energy Physics Laboratory, Stanford University. 1961–, Director, Professor, Stanford Linear Accelerator Center, Stanford University.

Special fields: X-rays and natural constants; accelerator design; nuclear research; high-energy particle physics.

Activities: 1945–60, Division of Military Application, U.S. Atomic Energy Commission. 1954–58, Member, Physics Panel, National Science Foundation. 1955–57, U.S. Air Force Scientific Advisory Board. 1951, Radiation Laboratory, University of California. 1958, Stanford Research Institute. 1960–64, President's Science Advisory Committee. 1959, Office of Director of Defense Research and Engineering (member, Ad Hoc Group on Detection of Nuclear Explosions). 1959, WAE Foreign Service Officer, Department of State: Chairman, U.S. Delegation (Geneva), Technical Working Group on High-Altitude Detection; Vice-Chairman, U.S. Delegation (Geneva), Technical Working Group 2. 1958–60,

Member, High-Energy Commission of International Union of Pure and Applied Physics. 1958–60, Review Committee for the Particle Accelerator Division and High-Energy Physics Division, Argonne National Laboratory. 1959–61, Advisory Council, Department of Physics, Princeton University. 1958–62, Advanced Research Projects Agency. 1964–64, Advisory Committee, 200-BeV Accelerator Study, Lawrence Radiation Laboratory, Berkeley. 1965, Consultant, Office of Science and Technology, Executive Office of the President. 1967, Member, High-Energy Physics Advisory Panel to the Atomic Energy Commission. 1968, Advisory Committee, Brookhaven National Laboratory. 1968, Advisory Committee, Cambridge Electron Accelerator Laboratory. 1969, Advisory Committee, CalTech for Physics, Mathematics and Astronomy. 1965, Steering Committee, JASON Division, Institute for Defense Analyses.

Societies: Phi Beta Kappa; American Physical Society (Fellow and Member of Council, 1956–60); Sigma Xi; National Academy of Sciences; Amer. Acad. Arts and Sciences.

Awards: Guggenheim Fellowship (1959); Ernest Orlando Lawrence Memorial Award (1961); Richtmyer Lecture (1963); California Institute of Technology—Alumni Distinguished Service Award (1966); California Scientist of the Year Award—1967.

Publications: Classical Electricity and Magnetism (with M. Phillips), Cambridge, Addison-Wesley (1955); 2nd edition, 1962; numerous scientific papers in professional journals.

Personal data: Name: Wolfgang Kurt Hermann Panofsky. Born 24 April 1919, Berlin, Germany. Entered U.S. September 1934; naturalized April 1942. Married (Adele Irene DuMond). Children: Richard Jacob, October 13, 1943; Margaret Anne, October 13, 1943; Edward Frank, April 19, 1947; Carol Eleanor, January 12, 1951; Steven Thomas, December 13, 1952.

Home address: 25671 Chapin Ave., Los Altos Hills, Calif. 94022.

STATEMENT OF DR. WOLFGANG K. H. PANOFSKY, DIRECTOR, STANFORD LINEAR ACCELERATOR CENTER, STANFORD UNIVERSITY

Dr. PANOFSKY. Mr. Chairman and members of the committee, I appreciate very much having——

BACKGROUND OF WITNESS

Senator GORE. Excuse me, Doctor, Senator Fulbright suggested that I say something about your background.

Senator FULBRIGHT. Doctor, I think the record ought to show a little about your activities in the past relevant to this inquiry, because a lot of people are not acquainted with you.

Senator GORE. From my personal acquaintance, Dr. Panofsky is one of the truly outstanding physicists of the world. He is director of the Stanford Linear Accelerator Center. Doctor, tell us some of your pedigree. [Laughter.]

Dr. PANOFSKY. Well, I am a high-energy physicist. A high-energy physicist and my primary work is involved with the Stanford Linear Accelerator Center. I have testified before this subcommittee before, because I was also chairman of the technical working group negotiating at Geneva in connection with the high-altitude test ban. But my regular professional work has almost entirely been in high energy particle physics, but I have been interested in the subject of missile defense for a long time. I have been a member of the President's Science Advisory Committee for 5 years from 1959 to 1964.

Senator FULBRIGHT. How long have you been in Stanford, and where were you before that, doctor? This is purely for the record. We would like to know something—we always do—about the credentials of our witnesses.

Senator GORE. I would like to insert in the record at this point a brief statement of his experiences. (See page 325.)

Senator FULBRIGHT. I think the public also would like to know a little about you.

Dr. PANOFSKY. I have taught at the University of California from 1945 to 1950, and then I have been at Stanford since 1950 as professor of physics, and then director of the High Energy Physics Laboratory, and then director of the Stanford Linear Accelerator Center. This is a basic research institution which serves the scientific community from many parts of the country.

Senator FULBRIGHT. Was I correctly told that you have very special competence as an engineer in the field of radars?

Dr. PANOFSKY. I do not have any special competence in radar. However, the Stanford linear accelerator, which I directed in building, is a very large engineering enterprise. It was funded by the Atomic Energy Commission and we are very proud of the fact that it was built using some very sophisticated electronic techniques, both on budget and on schedule.

Senator GORE. The Joint Committee is very proud of this gentleman. He has made a wonderful contribution.

Senator FULBRIGHT. I wanted to know a little bit about him. I am not on the Joint Committee and I didn't attend any of their hearings, and I don't think many people have.

Dr. PANOFSKY. I feel to some extent the distinction of being an engineer and scientist is not very large these days because many of the tools of the scientists themselves are major engineering enterprises.

Senator FULBRIGHT. I understood Mr. Packard to say that he had consulted you as an outstanding engineer. I may have misunderstood.

Dr. PANOFSKY. Thank you very much.

Mr. Chairman, I appreciate very much having the opportunity to testify before your committee on this important issue. I am speaking to you as an individual scientist, who had been interested in the ABM problem for a long time, beginning with my service on a special ABM subpanel of the Scientific Advisory Board of the Air Force in 1955, and continuing in various advisory roles.

MEETING WITH SECRETARY PACKARD

To clarify the record I would like to state that I did not participate in any advisory capacity to any branch of the Government in reviewing the decision to deploy the current modified Sentinel or Safeguard system—I appreciate having had the opportunity of an informal discussion with Mr. David Packard, Deputy Secretary of Defense, several weeks ago prior to the modified Sentinel decision.

Senator GORE. To what extent was this? Was there an extended conversation over a period of time?

Dr. PANOFSKY. About half an hour.
Senator GORE. About half an hour?
Dr. PANOFSKY. That is correct.
Senator GORE. Did you call upon him or did he call upon you?
Dr. PANOFSKY. We happened to accidentally meet at the airport.
Senator FULBRIGHT. What airport?
Dr. PANOFSKY. San Francisco.
Senator GORE. Thank you.

ARMS RACE IS A TRAGEDY

Dr. PANOFSKY. I consider the arms race between the United States and the Soviet Union one of the great tragedies of our time. For this reason I very much welcomed President Nixon's statement that he had especially intended the ABM decision not to interfere with forthcoming talks between the United States and the Soviet Union on limiting strategic offensive and defensive forces on both sides. In particular I welcomed the President's statement that any contemplated ABM deployment should not be interpretable by the Soviets as threatening their deterrence against the United States. Accordingly President Nixon emphasized the role of an ABM system in protecting our retaliatory force in contrast to a full city defense. In this particular connection I agree emphatically with the other testimony you have heard that a city defense would escalate the arms race because it would cause the Soviet Union serious concern about its ability to deter us from a first strike attack against them. I, therefore, opposed the old Sentinel deployment precisely because it could be expanded to a heavy city defense and also because in my view the argument for a thin ABM against Chinese aggression lacked validity.I will say more about this particular role of Sentinel later.

CRITICISM OF TECHNICAL CONCEPT OF SAFEGUARD SYSTEM

My principal criticism of the modified Sentinel-or-Safeguard system therefore relates not so much to its stated purpose but rather to its present urgency or lack of it, and to the actual technical concept of its planned execution. The stated aims of the modified Sentinel system are both defense of the hardened Minuteman sites and of our strategic bomber bases. Additional objectives are protection against accidental launch and protection against a limited Chinese attack. The urgency of proceeding with deployment is attributed to the newly raised technical possibility that the Soviets may have developed a "first-strike" capability by 1975. What does first-strike capability mean? It means in principle that the Soviets could launch an attack so highly synchronized that it would at the same time take our Polaris fleet, our strategic bombers, our Minuteman force and our tactical nuclear aircraft out of action to the extent that they could not launch a retaliatory attack sufficient to penetrate Soviet defenses.

SKEPTICISM ABOUT SOVIET FIRST STRIKE

I would like to express considerable skepticism that an attack of the kind envisaged by the Department of Defense witnesses could be mounted by the Soviets with any confidence of success. One has

to recognize that such a "first strike" implies that the Soviet decisionmakers would have to make a rational decision for such a fully coordinated attack and that in the absence of having carried out any operational tests involving nuclear warheads, (forbidden by the atmospheric test ban), they would have confidence that such an attack would actually work. I consider this to be an extremely implausible projection of our available intelligence, including that concerning the SS–9. I can think of no better prescription for accelerating the arms race than taking the position that we must prepare a fully safe countermeasure for any technically imaginable contingency. It is this kind of planning which, from the narrow point of view of the military, may appear conservative but which can lead to disastrous consequences for the survival of the United States, or in fact, the entire world.

OBJECTION TO INCLUSION OF BOMBER DEFENSE

Next, let me say that I specifically object to the inclusion of bomber defense in the modified Sentinel plan as an element of a defense against a first strike. Bombers can take off from their runways on very short delay. If we did imagine a coordinated attack both on our missile sites in the north by multimegaton missile warheads, and at the same time an attack from the sea on our bomber bases, then the amount of warning available from the ICBM attack against our missiles would be adequate to get the SAC bombers into the air. On the other hand, if the bomber bases were attacked first, although part of the bomber force might not escape destruction, our missiles, both on land and sea, would be intact, and the Soviet planners would know that they would be exposed to a disastrous retaliatory strike from our Polaris and Minuteman force. They also know that the Minuteman force by itself far exceeds the level of destructive capability required for a retaliatory second strike. Furthermore, in a period of heightened international tension it is possible (as we have done in the past) to put our SAC bomber force on "airborne alert," that is, to keep a substantial fraction of them in the air at all times to give additional security against a successful first strike. Therefore, I am very concerned that the inclusion of the bomber defense beyond phase I of the DOD proposal, makes the system less easily distinguishable from a first step toward a city defense which would, as President Nixon has said, be provocative.

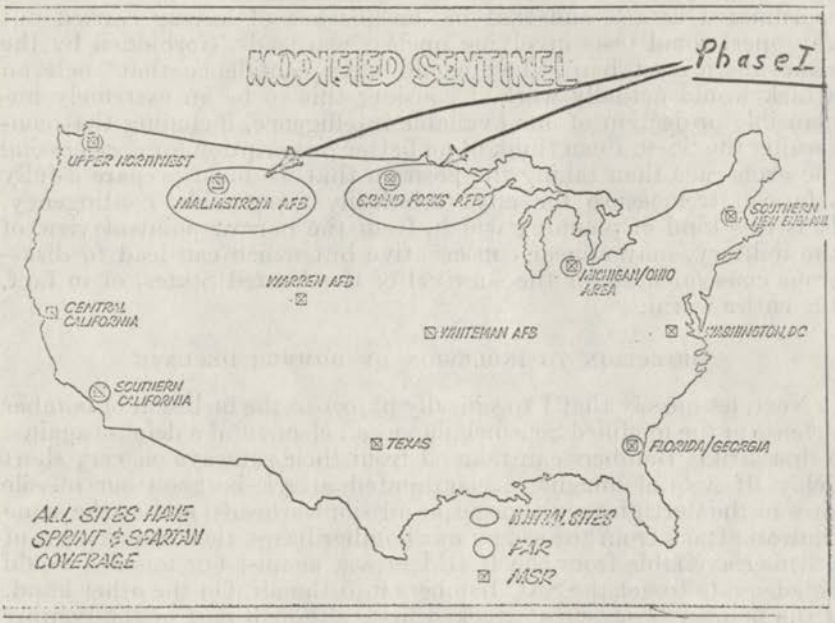
In short, I can see no justification whatsoever either on military or political grounds for including bomber defense in an ABM system designed to protect our retaliatory force.

How is the present modified Sentinel actually configured? I have here the chart and, Senator Gore, following in your footsteps of the battle of the charts, which shows the Defense Department's presentation of the modified Sentinel system.

Senator GORE. You are getting to yours a lot easier than I got to mine or Mr. Packard got to his.

Dr. PANOFSKY. We had a busy day yesterday.

MODIFIED SENTINEL



Dr. PANOFSKY. As you see in phase I, which is the only decision now under consideration, only two of our Minuteman bases are to be protected, but in the follow-on phases, bomber bases are also to be defended by ABM sites some of which are in areas fairly close to cities, but not near any Minuteman launch sites. As an example, one of the California sites, and the New England sites are close to cities, but they are not near any Minuteman bases.

It is this component which I conclude lacks validity in the context of the President's own statement. I recognize that the administration's proposal is for a phased deployment and that only phase I is now to be authorized with further deployment to proceed on a year-by-year basis after suitable review. I note, however, that no operational experience will have originated from phase I before the scheduled decision on phase II is to be made.

CRITICISM OF ENGINEERING OF HARDPOINT DEFENSE

I want to turn now to serious criticism of an engineering nature in connection with those installations which are intended to protect the Minuteman force. My point is that an economical hardpoint defense—that is a defense of sites which have already been hardened to withstand impact of megaton weapons at relatively close distances—requires a design greatly different from a defense of soft targets such as cities. Let me show the next chart.

TECHNICAL REQUIREMENTS FOR AEM

CITY DEFENSE	"HARD POINT" DEFENSE
HIGH VALUE TARGET	LOW VALUE TARGET
Intercept at high altitude	Intercept at low altitude
Long fly-out range	Short fly-out range
Soft or slightly hardened Radar	Very hard Radar
Decoy discrimination at high altitude	Atmosphere eliminates decoy
Complete elimination of incoming missiles	Attrition of incoming missiles
Cost per anti-missile may be substantial	Anti-missiles should be inexpensive
Number of anti-missiles related to strength of enemy force	Number of anti-missiles related to number of retaliatory missiles protected

I note the Sentinel System was originally designed to defend soft targets but now essentially the same components have been taken over for a completely different purpose. The only exception is that some additional faces have been added to the MSR radars. Let me, however, elaborate on the difference in requirements.

I would like to point out that a city defense and a hard point defense has completely different technical specifications, and technical requirements; therefore making a policy decision which uses the same components for a very different purpose is necessarily a very poor engineering decision. Let me summarize.

1. A hardpoint defense radar can be much simpler and cheaper than one intended for city defense since it is permissible to intercept the incoming missiles at very much lower altitudes where the atmosphere has done most of the job in filtering out decoys or any innocuous material accompanying the warhead. Therefore much less traffic has to be handled by the radar.

2. The defense installation should be extremely hard itself if it is going to be able to defend a set of hard targets. The MSR radars can withstand an overpressure of less than one-tenth of what can be tolerated by the missiles they are to defend. Clearly an enemy in planning a first strike would attack primarily the more vulnerable radar and thereby deny the effectiveness of defense.

3. For the hardpoint mission the short-range missiles required for terminal intercept could be much smaller and simpler than the Sprints which cost about $2 million each.

4. In the city defense we are interested in giving total protection, that is, complete elimination of incoming missiles. In the hardpoint target defense we wish to protect our deterrence only; some attrition of incoming missiles therefore is necessary to enable some of our deterrence to survive.

5. Since the target which is to be protected in city defense is tremendously valuable, the cost of the antimissile could be very high. On the other hand for a hard point defense the cost of the antimissiles

should have some reasonable relationship to the cost of the missile to be protected, because otherwise from the cost point of view it would be very much cheaper to protect the deterrence by increasing the size of the deterrence rather than to protect it.

6. And the last point is that the number of antimissiles which should be available should be sufficiently large that the enemy could not simply exhaust them by its attack against our retaliatory force and then would simply be able to attack the retaliatory force itself. Now one can always give the usual "but it is better than nothing and we need it now" argument. Here I again disagree. The defense as described here is still very imperfect. To maintain their present threat to Minuteman the Soviets could defeat the present system with its relatively small number of antimissiles by increasing their offensive forces correspondingly.

So, what I have shown here on this chart, Mr. Chairman, is that the technical requirements for a reasonably well-designed defense which meets the stated objective of the President; namely, to defend the Minuteman site and the technical requirements of a defense which was for cities, which is not the current objective, are very different, and, therefore, necessarily, a simple reconfiguration of the city defense component would give a design which from an engineering point of view is very far from optimum.

If one believes that the Soviets are preparing for a first strike——

Senator GORE. May I interrupt at this particular point?

Dr. PANOFSKY. Yes.

REDESIGN NEEDED FOR SAFEGUARD SYSTEM

Senator GORE. In your view, would it be a reasonable conclusion for me to reach that from the standpoint of the facts which you have illustrated by this chart that a deployment of the originally planned ABM Sentinel system to a different purpose would require a considerable amount of research and redesign?

Dr. PANOFSKY. This is correct.

In fact, my point is that one is not talking about redeployment of the original Sentinel system. One is talking for an ad hoc design for this specialized purpose.

Senator GORE. So would it be also reasonable for me to conclude that you think even though the decision to deploy ABM in defense of the Minuteman sites, that it should not be undertaken immediately with the Sentinel which had been designed for a different purpose?

Dr. PANOFSKY. This is correct. I mean my view is that if the Soviet number of missiles keeps increasing at a continuing fast rate, and if we do not succeed in achieving a negotiated limitation of the strategic force, then defense of hardened missile sites would indeed be an objective which I would support, but that this should be preceded by development of a hard point defense system which is specially designed for this purpose, and this purpose only, rather than taking a city defense system and giving it the dual capability of bomber defense which I do not believe makes any sense, and hard point defense which, as an application, I believe has some justification, but for which this technical solution is extremely inefficient.

Senator GORE. Thank you.

Dr. PANOFSKY. I think this is in elaboration of that last remark, Senator, namely, if one really believes that the Soviets are preparing for a first strike, and if future Soviet missile deployments make this interpretation more plausible than it is now—we may need a really effective defense of our missiles and surely the cost to achieve this is far from irrelevant, and, therefore, inefficient design of the system for this purpose would make such a race a losing one for the United States, quite apart from the strong incentive to prevent this kind of race at all.

ADDITIONAL STATED OBJECTIVES OF MODIFIED SENTINEL SYSTEM

Let me now make some brief comments on the two additional stated objectives of the modified Sentinel system beyond defense of the retaliatory force. In addition to defending the land based bomber and missile retaliatory force, it is intended to provide protection against the emergent Chinese nuclear missile threat. The modified Sentinel system does indeed give some protection against a small accidental launch and I consider this to be a valid objective. However the degree of protection it does offer is highly limited. For one thing the chance of such an accident occurring is in itself directly related to the level of armaments and the degree of tension in the world, and therefore heightening of the arms race increases the likelihood of an accident. On a more technical level the effectiveness of the modified Sentinel in preventing damage from an accidental launch would depend very much on the nature of the accident. If it were due to some malfunction of control, the "accident" would include the dispersal of decoys or could involve multiple warheads; then in general the Sentinel system could be penetrated, because it is insufficient to to cope with a highly sophisticated threat.

It is true that a single accidental launch might be stopped by the Sentinel. However, here we have the practical problem of whether the state of alertness of the system in peacetime can be kept at a high enough level that it would be effective against a single incoming missile. Our experience with current military systems is such that this would be a very difficult thing to achieve.

In short I agree that the modified Sentinel has some limited value in providing protection against accident but it is indeed a very limited value.

PROTECTION AGAINST A CHINESE ATTACK

Protection against a Chinese attack was the initial motive for proposing deployment of the original "thin" Sentinel system and it has remained one of the objectives of the modified system. The President has agreed that active city defense against a heavy Soviet attack is ineffective as well as being provocative and that prevention of nuclear war through deterrence or other means is our only fruitful approach to safety. The proponents of an active thin city defense against Chinese attack are thus implying that deterrence would not be acceptable protection in relation to China. At present we have two forms of protection against Chinese nuclear attack: One is deterrence—we can indeed inflict enormous damage on the Chinese

in case of a nuclear attack on their part. We even have a preemptive capability, that is, we could strike Chinese launch sites which might emerge in the 1970s without fear of substantial retaliation. At present the United States has an undeniable first strike capability against China; that is, we could resort, but happily have not chosen to, to a nuclear attack without fear of retaliation on their part. All the modified Sentinel system would do is to extend by a totally uncertain period the time over which this country would have such a first strike potential against China, and this would be the only objective in relation to China which the modified Sentinel would serve, and I would leave it to the judgment of the country whether this is a worthy objective.

SUMMARY

To summarize, if the Soviet threat continues to grow rapidly I would support development of a system which would truly implement the President's decision to defend the hardened Minuteman sites. I am aware of many studies which have shown that should our Minuteman force be seriously threatened it would be cheaper to increase our Minuteman force rather than to defend it. However, I also agree that it would be less provocative to the Soviet Union to defend the force we have, rather than to increase it. However, such a defense should be efficiently designed for this purpose and for this purpose only. The modified Sentinel or Safeguard is simply a reconfiguration of the city defense Sentinel and I consider its deployment an unwise decision from many points of view, from the point of view of sound engineering judgment, economy, and stopping of the arms race, and this last goal is more important than all the others.

Thank you, Mr. Chairman.

Senator GORE. Well, thank you, Doctor.

In view of your recognized eminence in this field, I hope the panel will be agreeable for each Senator to have a few questions for you and then go to the other witnesses for their statements. Then we would hope you would be willing to stay and join with us in the panel discussion.

PROBABILITY OF AN ALL-OUT SOVIET ATTACK

Secretary Laird advanced as his principal reason for recommending the deployment of an ABM system that it was necessary to preserve the integrity of our deterrents.

Now, as I understand you, you say we have our submarine nuclear fleet, the Polaris missiles, the strategic Minuteman ICBMs, the Strategic Air Command, and also something to which you did not refer, missiles that we have on foreign bases and also tactical weapons in Western Europe, some of which are aimed at Soviet targets. In view of all these weapons, which, by the 1970s according to current plans would mean a total of approximately 10,000 nuclear missiles, it is your view, as I interpret it, that the Soviets could not, and are not likely to, think that they could have such proficiency as to knock out all of these 10,000 missiles or a sufficient number of them so that this country could not retaliate with a devastating blow.

Dr. PANOFSKY. Yes; this is correct.

I believe that a scenario in which the Soviets would make a rational decision to take out on a synchronized attack all the vast multiplicity of retaliatory force which we have is simply not a reasonable thing for them to do.

In addition, purely on the basis of numbers, it is very difficult to support the Secretary's contention. Even on purely technical grounds, if one puts in any kind of correction for the reliability of the Soviet missiles, which clearly cannot be 100 percent, and where the Soviet planners would have to assume it is not 100 percent, it becomes a very unreasonable assumption that the Soviets could have any confidence in a first strike attack in the time period which I believe the Secretary referred to.

INTRODUCTION OF CONGRESSMAN ANDERSON

Senator GORE. Inquiry has come to the Chair from some people at the press table about the identity of our guest today. I hope you will pardon me for a late introduction. We have the honor of having with us the distinguished Congressman from my State, Congressman Anderson, formerly Captain Anderson who took the first nuclear submarine in through the Polar Cap.

Congressman, we are delighted to have you. Do you think the Navy is apt to stay ahead of the Soviets in nuclear capability, Congressman?

Representative ANDERSON. Senator, first, may I say I appreciate the hospitality of this great committee this morning.

There have been statements made recently, leaving the implication that when we get to 1972, 1973, 1974, some of the technology that the Soviets are working on will be adequate to neutralize our Polaris submarines. I checked around some and I find no evidence whatsoever to support such a statement.

Senator, for the past half century about every 3 or 4 years someone claims to come up with something that is going to put the submarine out of business. The claims continue, and they demonstrate no more basis now than in the past. I think that the Polaris is such a remarkable weapons system, such a remarkable breakthrough, that we can count on it certainly today and, with adequate attention, its future development. I think we could count on it very definitely for the future. I think the Soviets know it.

As this subcommittee knows so well, the Soviets are engaged in a very aggressive and rapid effort to develop their own Polaris-type fleet and I think we can expect to see that deployed on a major scale in the reasonably near future.

Senator GORE. Thank you, Congressman.

DANGER TO POLARIS MISSILE

Senator SYMINGTON. Will the Chair yield? Based on my limited knowledge of the subject I would agree with what Congressman Anderson said. When the question of future dangers to Polaris came up apparently, it could not be explained, justified, because of classification. I believe the Polaris submarine today is the greatest strategic weapon in the world; and also believe, if there is any real danger to

its operations, that it is because we have failed to recognize that other people can do what we can do; and therefore have not given enough money to our submarine defense picture, rather favoring other obsolescent programs. Right now, as the Defense Department comes up for this multibillion dollar addition in cost to the American people, in the same statement they reduce, by over $100 million what they plan to put into what could be the most important part of this budget, namely submarines. I am talking about submarines which would be a danger to the Soviet Polaris-type submarine and to their surface ships. Combat ships in the future would appear to be going under the seas.

Thank you, Mr. Chairman.

Senator GORE. Senator Fulbright.

Senator FULBRIGHT. Mr. Panofsky, you have given a most persuasive and reasonable explanation of this matter in clear and concise terms that even I can understand.

Dr. PANOFSKY. Thank you.

Senator FULBRIGHT. I think you are the most intelligible scientist in dealing with highly sophisticated matters that I have heard.

Your technical competence seems to be beyond question and I had not known about your experience and your reputation.

LACK OF CLARITY REGARDING DOD COMMENTS ABOUT PROGRAM REVIEW

What does bother me very much indeed is to see arise at this early stage in a new administration what I would consider a very serious question of credibility. Yesterday, we discussed this matter of semantics, and I believe Senator Javits or Senator Case, suggested we ought to have some new words. I don't like to use that word either, but here is a case where I was pressing the Deputy Secretary of Defense, himself a very successful engineer in the field of electronics, reputed to have built a tremendous business, which will probably participate in these programs, who when pressed to say how was this very complex matter reviewed, said it was reviewed by outside people.

He was somewhat reluctant to name them, but in being pressed he mentioned only you, clearly leaving the impression that he had consulted with you, and while he didn't say so, one would guess that you had approved this program. In our judgment from your testimony it appears that he didn't listen at all to your advice, if you gave him any advice at the airport.

But this raises a question, it raises very serious questions of relations between this committee, the Congress and the executive. Are we to be trifled with and told there has been a review if there has not? My impression is that there has been no review at all, outside of the people within the Pentagon who are completely in agreement about the program. This was a very superficial review which was designed to try to conciliate those who are most interested in keeping the arms race going, to disarm, if possible, those critics of this program. It looks now as if that is what it is.

Why he would name you as his consultant is beyond comprehension. Do you have any explanation why he might pick you? I asked if he wouldn't name just one and he finally said you. Why would he do that?

Dr. PANOFSKY. Senator Fulbright, I am afraid I have no way to know what reviews the Defense Department has carried out on this matter. I believe, if you give me permission to say, that possibly undue importance has been given to Mr. Packard's casual remark here. You

asked him who outside the Defense Department he had talked to, and I believe my name just came to his mind. In this casual conversation, which by the way by its nature, being in the airport, of course, was of an unclassified nature and, therefore——[Laughter.]

I simply expressed some relatively simple opinions as I did here, that I am not fundamentally opposed to ABM as a means of protecting our hard missile sites.

I believe that if the threat continues to develop then this may well be a right way this country should move because it would protect the deterrent we have without at the same time proliferating it and making it more threatening to the other side, and I also said that my engineering judgment was that the system which would be necessary to do this would have to be designed on different principles.

Now, of course, he did not tell me about the nature of the pending decision; and I am sure this was quite a while ago—

Senator FULBRIGHT. He did what?

Dr. PANOFSKY. At that time I am sure that the decision was not yet made on how actually to proceed. So, therefore, I, of course, had no knowledge at that time as to the actual——

Senator FULBRIGHT. When was this interview?

Dr. PANOFSKY. About 3 weeks ago. I can establish the date. I do not have it with me.

Senator FULBRIGHT. Approximately 3 weeks ago?

Dr. PANOFSKY. Approximately. But this is subject to verification, Senator.

[The date of the meeting, February 23, 1969, was later supplied.]

OPINION OF OUTSIDE WITNESSES NEEDED

Senator FULBRIGHT. At San Francisco? You see, this is not a new subject. This matter came up last year on the Senate floor when I asked the chairman of the Armed Services Committee who outside of, you might say, the employees, the people under the control of the Pentagon, were called as witnesses before the committee to speak about the previous Sentinel program and nobody was. We made some point of this. It was mentioned in the press. Later, Senator Stennis agreed in a public statement that he was going to call some outside people to give balance to the testimony. To have only the employees of a Department is limiting the testimony. We feel there is some restriction upon their freedom of action and what they would say. So this is the same reason I brought this up. It wasn't just a passing thought. Mr. Packard said in his initial statement they had thoroughly reviewed this matter, and the modified system had been their deliberate judgment after review. I was seeking to test just how credible was that review. He was extremely reluctant to answer. I had to ask him twice. I came back to this subject, and urged him to give us some idea of just how serious this review was, and who was consulted, and he was very reluctant to do so.

It leads me to the feeling they don't take this committee or the Congress seriously; that they think they can pull the wool over our eyes by making these statements.

Now, your criticism of the conclusions they reached only fortifies my view there was no serious review of this. Instead of being a serious scientific, technical review, consulting engineers or scientists such as yourself, this was purely a political gimmick, just to try to get over a hard place because the serious criticism had been raised under the

leadership last year by Senator Cooper, who is not here today. This is a most serious matter involving not only billions of dollars but, as you pointed out very well, the possibility of an arms race that could lead to the devastation of the world. It is not a trifling matter. You would agree to that, wouldn't you? It is not a matter to be passed over in a casual way.

Well, that is the part of it that bothers me.

INCREASING THE MINUTEMAN FORCE

Now, you make one point on a matter which has been raised before and seriously argued by the Senator from Missouri. You said: If the Soviet threat continues to grow rapidly I would support development of a system which would truly implement the President's decision to defend the hard Minuteman sites. I am aware of many studies, which have shown that should our Minuteman force be seriously threatened it would be cheaper to increase our Minuteman force rather than to defend it.

I couldn't agree with you more. I think that is perfectly obvious. This question has been raised. However, I also agree it would be less provocative for the Soviet Union if we defended the force we have. But if we were rapidly increasing it why would we care about being less provocative? We are in an all-out arms race if they go for a first strike. Why would the consideration of being less provocative have any relevance at all to that kind of a situation?

Dr. PANOFSKY. Well, Senator, it is sometimes very difficult to diagnose whether they really do or don't intend to achieve a first strike posture.

Senator FULBRIGHT. Why do you say that? The Secretary of Defense said without any doubt that is what they are doing. You wouldn't think he would say that without reason, do you?

Dr. PANOFSKY. It is a matter of judgment. If the total number of missiles increases, one can go into the usual dialog whether it is only for retaliatory purposes or whether it is for first strike purposes, and clearly there will be and can be difference in judgment on this, as there is now. I expressed my judgment on what the intent of the present increasing Soviet levels are, and the Secretary expressed his. But I believe the figures we are talking to, both of us are talking to, are the same.

Senator FULBRIGHT. Well, Mr. Panofsky, maybe I don't understand it. It seems to me that both sides, in order to make a case at all, must, if there is anything to logic at all, assume the other side is trying to achieve a first strike capability. If the assumption is a second strike capability, well, that means you can completely control that without even having a force because if you are not going to strike them and they have only second strike capability there is never any occasion for a second strike. Or is logic completely irrelevant to these scientific matters. [Laughter.]

CAPABILITY OF A WEAPON FOR FIRST OR SECOND STRIKE

Dr. PANOFSKY. Whether a given weapon is suitable for first or second strike depends on many technical factors, and there is a certain region where you can't tell. As an example, I believe everyone recognizes that our Polaris force is suitable only for a second strike because of that fact that the explosive yield per warhead is so small that it could not take out any hardened sites, and the main purpose of the

Polaris is to be able to respond after an attack, and be able to respond after considerable delay. So there is no question here; everybody would agree that the Polaris fleet on their side and on our side would be a second strike weapon.

Senator FULBRIGHT. Why wouldn't it be logical, that being so, that we try to abandon all Minutemen or similar weapons and each side have only Polaris or similar weapons where everybody would be agreed, as you seem to be, that they are only capable of second strike.

Dr. PANOFSKY. Well, I can give some arguments about that.

First, I would like to make a small correction to the statement that was made, that in relation to first strike against airfields, Polaris does have value, so even there the situation is not quite as clear as that. And the other reason is that in general to preserve ones retaliatory force the military feel, and in general, I would agree, that there is value for some multiplicity of methods in case some initially unrecognized failure in one of the systems would become evident.

Senator FULBRIGHT. Well, Doctor, I think you have made a very valuable contribution to the hearing, I appreciate it. Thank you very much.

Senator GORE. Well, is it the pleasure of the subcommittee to proceed with questions now with Dr. Panofsky or shall we go to the other witnesses and then question them all as a panel? What is the wish of the Senators? Senator Case.

Senator CASE. We have two apiece, the Chairman has four.

Senator GORE. I will stand by the rule I fixed myself.

PERIODIC STRATEGY REVIEW BY OUTSIDE EXPERTS

Senator CASE. I think I only have one question, Doctor. It is to ask your opinion of the suggestion made by Dr. Killian when he appeared before us that it was desirable to have an outside group of experts at regular intervals review in depth our basic defense strategy and our strategic weapons systems. This suggestion seemed to many of us to make great sense. It seems to me that your experience with Mr. Packard, and the paucity of outside review of the question of what we should do with the antiballistic missile system, adds weight to this suggestion. It would be my hope, Mr. Chairman, that our chairman, who sits at your left today only, would think seriously about the wisdom of having our committee take the initiative at setting up this kind of a review in collaboration perhaps with the Armed Services Committee. Such a review ought not to be left only to the administration, whatever administration it is, but ought to be a function of the real outside critic of any administration, and that is the Congress of the United States.

Would you express yourself about this, Dr. Panofsky? First of all, about Dr. Killian's suggestion and then perhaps about the suggestion that this be created outside the administration?

Dr. PANOFSKY. I have read about Dr. Killian's suggestion in the papers, and I do not have any strong views on the subject. This is a matter of the decisionmaking process of the Government. I do agree that independent review of these matters is indeed very necessary but I am not competent to judge as to what level or under whose auspices it should take place.

I do agree that the importance of these questions is such that definitely a review system of an independent nature would be of considerable advantage.

Senator CASE. By review system you mean a review system outside the executive branch?

Dr. PANOFSKY. Again, I have no strong views on the subject. Whether it should be outside, inside, or combined with the executive branch, I am not competent to judge.

Senator CASE. I am just trying to find out and not really trying to testify for you, although some of us have sometimes attempted to do that.

Dr. PANOFSKY. I am not really sufficiently confident in my views as to express them as to under whose auspices and under what administrative structure it should be handled.

INDEPENDENCE OF REVIEW IS ESSENTIAL

Senator CASE. The President did take some note of Dr. Killian's suggestion and said that he was going to have some sort of review made. But it seems to me clear that the independence of this review is one of the absolute essentials, not because of lack of integrity of the people in Government, not even necessarily their individual competence as a scientist, but just that only by an outside group can you have systems of this sort really appraised. Too often, it seems, we have competition between branches of government that leads to decisions not so much on the basis of what is best absolutely, but rather what is an acceptable compromise among the various forces. Is this a factor that you have experienced?

Dr. PANOFSKY. Well, I am sure that in the decisionmaking process within the Defense Department compromises of this kind do get made, and a technical review of a group not directly involved in the original decisionmaking process would be of great advantage. But I am simply not enough acquainted with the advisory board mechanisms within the executive to judge what mechanism should be used.

Senator CASE. Very well, I appreciate that, and I am much obliged to you for your willingness to hear me out.

Thank you very much.

Senator GORE. Senator Symington.

Senator SYMINGTON. Thank you.

Dr. Panofsky, it is a pleasure to see you.

ALLEGED SIZE OF SOVIET ABM SYSTEM

For many years the distinguished senior Senator from Tennessee and I had a friend, Mr. B. M. Baruch who once told me that one of the proudest things about his career was the fact that over the years he had achieved the nickname of Mr. Facts.

During these discussions we must get to the facts. Yesterday the Secretary of State, than whom there is no more honorable man in this town, stated, and I read from the record: "They have," that is the Soviets, "an ABM system of their own a lot bigger and more important than the one we are talking about so I don't see how they can criticize us for at least talking about it, starting it."

Over a long period I have done my best to find out what it is they have been doing for the past 7 years, and especially the last three or four; and because he is an honorable man, I am certain that the Secretary of State would never have made that statement if he had been briefed thoroughly by higher intelligence.

Later on in yesterday's hearing I suggested perhaps we should have a public briefing to get the facts; because how can you really judge a matter of this character without all the facts. As a well-known lawyer once said, partial facts are an evasion of facts.

The above statement by the Secretary was repeated this morning on television, and from it people would obtain the impression that they already have an ABM system a lot bigger and more modern than the one Defense says it plans to build.

It is fair to say, and I have done my best to find out, that if they are not abandoning the system they deployed around one city they have reduced effort as against what we, with excellent knowledge, believed they were going to do. Now I would ask a question.

Senator GORE. Before you ask a question, could I refer to this matter which you bring up? It was largely because of the sentiment which you have expressed that I pointed out in the hearing yesterday that while, according to the President's statement, the Soviets have 67 missiles deployed around Moscow. The two systems which we propose to deploy around Minuteman sites in Montana and North Dakota, involve only 400 defensive missiles, and it was to try to put this in perspective that I gave that information yesterday. Thank you, Senator.

SOVIET INCREASE OF ICBMS

Senator SYMINGTON. I thank the Chairman. Many people seem to be hanging many hats on what I thought was an obsolescent to obsolete looking rack.

It might be that one reason they have been putting so many ICBMs on launching pads in recent years—no secret because that aspect of their arming has been announced by everybody—is that since 1962 they have been working on an ABM. Maybe they found out, based on the state of the art, that an ABM is unworkable, especially when you consider saturation, which certainly we are capable of; therefore, they are glad to see us put so many billions of dollars into it.

Dr. Panofsky, I would ask this question: If we are successful in defending Minuteman bases in this way, and if they desire to maintain parity, would they not increase their ICBMs?

Dr. PANOFSKY. Only if they were genuinely interested in a first strike posture. If they were satisfied by a second strike posture, then, if we increased the defense of our Minuteman bases by ABMs, they would not have to increase their ICBM force.

Senator SYMINGTON. They are interested in a first strike capacity according to high authority. In any case, if they find out we are successful, and I am talking about the 12—we are only putting up two, are buying land for the other 10—would they not, in order to maintain their position of parity, build more ICBMs?

Dr. PANOFSKY. In the context of a first-strike posture desire on their part, the answer to that question would be yes.

Senator FULBRIGHT. I can't follow that.

Senator SYMINGTON. Wouldn't they want to have a second strike posture?

Dr. PANOFSKY. Their second-strike posture would in no way be endangered by our defense of he Minuteman sites.

Senator SYMINGTON. I see your point.

Dr. PANOFSKY. If our system were truly specialized—and my testimony indicated that I do not believe the system proposed by the Defense Department is—to defend the hardened Minuteman sites and designed optimally to do that and only that, in that case, the Soviets should not interpret such a system to endanger their second strike posture.

Senator SYMINGTON. What do you think would be the reaction in this country among scientists and military if the Soviets began to build modern ABM defenses around their SS–9s?

Dr. PANOFSKY. Well, clearly there are differences in views among the communities you identified, so I can only give mine. I would, I personally would, welcome such a move as being an indication of their strengthening their second strike posture; because it would clearly not strengthen their first strike posture.

Senator SYMINGTON. Thank you, Mr. Chairman.

Senator GORE. Senator Aiken.

IS ANNOUNCED SAFEGUARD PROGRAM ONLY A BEGINNING?

Senator AIKEN. Dr. Panofsky, when President Nixon proposed the Safeguard system 2 weeks ago, I felt that it received rather general acceptance throughout the country, and also by some Members of Congress because he had apparently discarded much of the program which was proposed to us last year. But since he made that proposal for a Safeguard program there have been so many people, including experts and officials and so forth, that have either implied or directly referred to it as being only a beginning program. I feel that it has lost a great deal of the support which it had at the time that President Nixon first announced it.

Do you believe that the Safeguard program as proposed by President Nixon is a beginning program?

Dr. PANOFSKY. It is definitely proposed to be a *phased* activity. My understanding of the situation is that he is at this time asking for authorization to proceed with the two northern sites, and then in succession of phases he would protect all the Minuteman fields and a certain fraction of the bomber sites. That is the intent, but I have expressed my concern that at least the bomber protection part of the system could very well grow back into the original city defense, at least to some extent. But it is the package which the administration has presented, is in itself a phased program is the way I understand it.

Senator AIKEN. Then the answer is that it easily could be a beginning program?

Dr. PANOFSKY. It could certainly be a beginning program, although stepwise authorization would certainly be required.

CONTROVERSY OVER POLARIS IMPROVEMENT PROGRAM

Senator AIKEN. My other question is this: You are, of course, aware of the difference of opinion which took place all last year, and probably still exists, between those who say we should continue to

improve our Polaris fleet and capabilities as improvements become feasible on a year-to-year basis, and those who say that we should postpone any revision of the Polaris fleet for about 5 years until we have an accumulation of improvements to build on to them and, in the meantime, spend money on an ABM system. Do you want to take sides in that controversy?

Dr. PANOFSKY. I am not sufficiently acquainted with this particular matter to take a position, Senator. I have now made a study of the ABM situation, and given you my views, but as to the Polaris improvement program, I am not sufficiently acquainted with its details to make a comment.

Senator AIKEN. You seem to be quite knowledgeable. In other words, you don't want to get caught in the middle of that controversy.

Dr. PANOFSKY. No; I am honest in stating that. I am not acquainted in sufficient detail to comment on this particular question.

Senator AIKEN. Perhaps I wouldn't have thought of that except for the presence of Captain Anderson this morning.

Senator FULBRIGHT. Mr. Chairman, may I ask a clarifying point?

Senator AIKEN. Those are all the questions I have.

REASON FOR U.S. MIRV DEPLOYMENT

Senator FULBRIGHT. Mr. Panofsky, you seem to be certain if we proceed with an ABM that the Russians couldn't possibly feel concerned about it because it is only a second strike. This contention is not entirely logical. Isn't it a fact that when, among other reasons, we discovered they were beginning to deploy an ABM system, our reaction wasn't to be unconcerned about it but to proceed with MIRV, the multiple warhead weapon? I think we have had such testimony. Is that a fact, do you know?

Dr. PANOFSKY. The motivation given for MIRV development in this country was twofold: One was to penetrate a possible ABM system, but a city, not a "hard point," ABM.

Senator FULBRIGHT. Why? Are we more illogical than the Russians? Can you depend on them not to do anything if we develop ABMs everywhere?

Dr. PANOFSKY. You see at that time—I am not defending our decisions then, I am trying to recollect how they were made—one of the reasons for the decisions on MIRV deployment, was that there was evidence for a Soviet ABM which might be a city ABM. Now, my statement was, and I would like to clarify that again, that I would feel that if an ABM was developed which met the very much lower and specialized technical specifications of the right side of this chart; namely, one which could not possibly be mistaken for a city defense and which would involve, in effect, different technology, and which was deployed around our hardened missile sites, then the Soviets rationally could not interpret that as being a threat to their second strike capability.

Senator FULBRIGHT. Do you believe our Defense Department could possibly be interested in an inexpensive missile of any kind? [Laughter.]

Dr. PANOFSKY. I have no comment.

Senator FULBRIGHT. You know very well they wouldn't. If they are going to build it it has to be the best in the world. Isn't that their approach to all of this?

Dr. PANOFSKY. I do not know, sir.

Senator FULBRIGHT. How do you think they spend $80 billion a year if they don't have that attitude?

Dr. PANOFSKY. It will not be as expensive as Sprint. The size and the other parameters that go with this would permit a less expensive solution.

Senator FULBRIGHT. It seems to me if our reaction is not to be concerned and say "Oh, well, it doesn't bother us for them to have second strike capability," that is one thing. But to start with MIRV, a very menacing and an extremely important and expensive new development, as much as I admire your logic, I said a moment ago I doubt if there is any logic in this. I can't see any reason or logic in this whole procedure of an arms race.

SOVIET PRESS REACTION TO SAFEGUARD DECISION

I ask, Mr. Chairman, to have put in the record an article from the New York Times today. It is a special from Moscow, datelined March 27 and the headline reads, "Nixon's ABM Plans Arouse Soviet Press Critics," The Soviet press, as we all know, is not unrelated to the Government. They wouldn't be criticizing it if it didn't reflect the Government's views. I will put it all in.

Senator GORE. It will be placed in the record.

Senator FULBRIGHT. I would also like included in the record at this point excerpts from foreign broadcasts reflecting Russian press attitudes toward arms talks and the Safeguard project.

(The material referred to follows:)

[From the New York Times, Mar. 28, 1969]

NIXON'S ABM PLANS AROUSE SOVIET PRESS CRITICS

Moscow, March 27—The Soviet Union has apparently lifted in recent days its curtailment of criticism of the Nixon Administration as a result of the President's decision to go ahead with a limited antiballistic missile system.

In the last few days, virtually every important Soviet newspaper has accused the Nixon Administration of seeking to step up the arms race and of reviving a cold-war atmosphere.

Mr. Nixon and his Administration had been spared the usual criticism leveled by Soviet commentators, who were believed to be awaiting his first important foreign policy move.

Pravda, the Communist party newspaper, said today that Secretary of Defense Melvin R. Laird's "most recent speeches include deliberately pointed phrases about some kind of mythical 'Soviet challenge.' "

A PSYCHOSIS IS DETECTED

"One gets the impression that in the interests of the arms industry there is a desire to deliberately mislead American society, to once more fan up an arms-race psychosis," the commentator, Georgy Ratiani, said.

The Soviet news review Za Rubezhom noted that the decision to start on the Safeguard system had been Mr. Nixon's first important action in foreign policy. The magazine said, "A concrete decision was taken, which in no uncertain terms says that the new leaders of America are continuing to think in categories of cold war and policies 'from a position of strength'."

Sovetskaya Rossiya, the newspaper of the Russian republic, said yesterday that some American newspapers had reported that the Nixon Administration was going ahead with the Safeguard system to use it as a "trump card" in future negotiations with the Soviet Union. Its commentator charged that the decision showed that, in the guise of "security interests," the United States "is continuing the old policy of the arms race."

Izvestia, the Government newspaper, said last night that the decision could upset the general balance of military budgets. The paper urged talks on reducing the nuclear arms race in general.

Western diplomats here believed that the criticism was perhaps inevitable, since Moscow had an opportunity to portray the United States as less interested in disarmament matters than the Soviet Union.

But these diplomats said that the decision to begin criticizing the Nixon Administration took Moscow more than a week to make, since President Nixon's news conference on the Safeguard deployment was held March 14.

"This indicates the sensitivity of Moscow's true relations with the United States on arms control matters," the diplomats said.

The Soviet Union has made it clear to the United States for several months that it is ready to begin talks on any aspect of arms control, particularly on the reduction and limitation of missiles.

The Nixon Administration has chosen to delay the start of talks so that a complete review of American and allied security can be undertaken. Moreover, Mr. Nixon and his chief advisers are not believed willing to appear to be rushing into talks. Behind this attitude is believed to be a concern that the Soviet invasion of Czechoslovakia last August should not be pushed into the background too quickly.

The delay has annoyed Soviet officials, diplomats believe.

The Soviet press has recently devoted considerable space to the discussion within the United States on the reliability of an antimissile defense. American opponents of the program are quoted as saying that no such defense is effective and therefore is a waste of money.

In conversations with foreigners, Soviet officials stress that they would like to end the arms race because of the need to shift their resources into the civilian sector of the economy.

Diplomats here believe that Premier Aleksei N. Kosygin, for instance, would sincerely like some formula that would insure Soviet security without forcing the country into an even more expensive arms competition.

The general Soviet line at the moment is that parity has been reached in offensive capability, but that if the United States goes ahead with a major spending program on new weaponry, this could upset the balance. This, in turn, could make any arms-control agreement difficult to reach, since Moscow refuses to negotiate from a position of weakness, Soviet diplomats say.

EXCERPTS FROM FOREIGN BROADCASTS REFLECTING SOVIET PRESS REACTION TO ARMS TALKS AND THE SAFEGUARD PROGRAM

1. On January 20, 1969, Tass reported a press conference at the USSR Foreign Ministry at which L. M. Zamyatin read a statement on Soviet policy that included:

"The General Assembly welcomed the 1968 agreement between USSR and U.S. governments to begin talks on the mutual limitation and subsequent reduction of strategic means of delivering nuclear weapons, including defense systems. *For its part, the Soviet Government considers it necessary to reaffirm that it is prepared to embark on a serious exchange of opinion on this important question.*" (Italic added.)

Later, in response to questions, Zamyatin and Kirill Novikov, members of the collegium of the USSR Foreign Ministry said the Soviet Union "is prepared to sit down at a conference table with U.S. representatives to discuss mutual limitation and subsequent reduction of offensive and defensive nuclear weapons *as soon as the Nixon government declares its readiness to do so.*" (Italic added.)

2. On January 22, in an article "USSR Desire for Nuclear Disarmament Viewed" Glazunov notes that "certain U.S. circles intend to delay the beginning of negotiation at least until summer of this year . . . . *The Soviet Union believes that the sooner the talks start the better.* But if the new administration deems it necessary to postpone the beginning of talks, the Soviet Union will naturally have to take this into consideration." (Italic added.)

3. On January 30th, 1969, Moscow Radio to Eastern North America discussed the problem of reaching agreement on halting nuclear rearmament as well as restricting the strategic means of delivery and said "*The Soviet Government proposes that negotiations be started without delay on these issues.*" (Italic added.)

4. On February 2, 1969 on Moscow Domestic Radio, a speaker Begov said that the failure of the U.S.-Soviet talks on limiting and reducing strategic delivery systems to begin was based on "an artificial pretext," the Czechoslovak events. He argued that the pretext was for the purpose of stepping up the arms race.

5. On March 13, well known Izvestiya political observer, V. Matveyev said in Izvestiya:

"Moreover, different speeches are heard from the highest platforms in the United States. *Their authors suggest that there should be "no hurry" for these talks,* and they call for creating a "position of strength" and so on. *Calling for speeding up the arms race and developing the Sentinel system, these leaders refer to the absence of agreement with the USSR on these questions.*

However it is well known that the Soviet Government proposes that negotiations be started on limiting and curtailing both offensive and defensive weapons. Steps that might be taken in the disarmament field should not place one state or group of states in an unfavorable position with respect to other states. The balance of power now achieved provides an opportunity for concluding agreements on freezing and curtailing nuclear arms. . . ."

6. On March 18, 1969, Kosygin wished the 18 Nation Disarmament Committee success and noted that the Soviet Government attached great significance to the terms of the nuclear nonproliferation treaty "which demands from its signatories the holding of *negotiations in a spirit of good will—for effective measures to half the nuclear arms race and for nuclear disarmament.*" (Italic added.)

7. On March 17, 1969, in Pravda, an article by R. Mikhaylov said:

"As the USSR Government memorandum emphasizes, *the Soviet Union is ready to hold talks with other powers on the question of nuclear disarmament,* proceeding from the fact that during such talks agreement may be reached both on an entire complex of measures leading to the destruction of nuclear weapons and also on certain of these measures aimed at this goal."

8. On February 2, 1969 Pravda, an article by Viktor Mayevskiy:

"No Easy Matter but Practicable one" stated:

"Nixon declared that he "supports the idea of talks with the USSR" on reducing "Strategic Armaments", but he added here that he would like the talks *"to be held at such a time and in such a way that as far as possible this would simultaneously facilitate progress on unresolved political problems . . ."* Laird said that there is a possibility "in the not too distant future" talks in (sic) talks with the Soviet Union regarding limitations on strategic offensive and defensive nuclear missile weapons systems. At the same time, he referred to the United States' need for "nuclear superiority" inasmuch as, he said, this would strengthen the American position at the talks.

Foreign press commentators are trying to gain an understanding of what, in fact, determines present U.S. "nuclear policy"—the efforts for "supremacy" or recognition of the "sufficiency" of nuclear weapons. . . ." (Italic added.)

9. On Moscow Domestic Radio, February 2, 1969, Vikenty Matveyev a noted Izvestia Political Commentator said:

"If one is to believe the Christian Science Monitor, the conservatives in Washington even express public anxiety lest American diplomats blunder and miss the opportunity to again exert pressure on the Soviet Union. *Let us say at once that a policy of pressure, whoever may use it has never brought and never will bring the desired results in relations with our country.* (Italics added.)

10. On March 17, after the Safeguard decision, R. Mikhaylov wrote in Pravda in an article "Faced with Urgent Tasks":

President Nixon's answers to America's other problem—the Sentinel project—is much the same (as his escalation in Vietnam). His administration has virtually endorsed the decision of the Johnson regime to launch another round of preparations for a bigger war. Mr. Nixon tried to sooth the American public by modifying the old project a bit, but its very foundation, doubtful and dangerous remains the same. Just like the old scheme, the first stage of the Sentinel project will cost several billion dollars and like in the old project this will be followed by still more expensive nuclear installations topping 100 billion dollars. Then, just like Johnson's Sentinel system, *the Safeguard system does not bank on disarmament or stronger peace through negotiations, but on a drive for arms with all the dangerous consequences that it spells.* . . (italics added).

11. On March 15 at 2300 Moscow Radio, said:

"The fact that the antimissile system will be built gradually stage by stage does not change anything. . . . America is starting on a new and highly expensive round of arms race . . ."

Senator FULBRIGHT. This material would indicate an inconsistency with the idea that the Russians are relaxed about this whole development.

Senator GORE. I call attention to the fact that Secretary Laird in his testimony before the subcommittee said that it was necessary to target two strategic missiles, to use his words, against each of the 67 deployed around Moscow in addition to what we already have targeted around Moscow.

BIOGRAPHIC INFORMATION

Dr. Panofsky, I hope you will not think I am attempting to discriminate against you. I did such a poor job in introducing you that I have asked the staff to prepare a biography of each of the other two gentlemen, and I will ask them to prepare one for you (see page 325).

Dr. Donald G. Brennan is a mathematician and student of national security problems. His special interests are in advanced military policy, alliance relationships in Europe, and selected areas of arms control, such as policy issues relating to ballistic missile defense.

Prior to joining the Hudson Institute, of which he was president from July 1962 until May 1964 and where he now conducts research studies, Dr. Brennan worked for 9 years as a research mathematician and communication theorist at Lincoln Laboratory of the Massachusetts Institute of Technology.

(The biographic sketch follows:)

DONALD G. BRENNAN, HUDSON INSTITUTE, NEW YORK

Donald G. Brennan is a mathematician and student of national security problems. His special interests are in advanced military policy, alliance relationships in Europe, and selected areas of arms control, such as policy issues relating to ballistic missile defense.

Prior to joining Hudson Institute, of which he was President from July, 1962 until May, 1964 and where he now conducts research studies, Dr. Brennan worked for nine years as a research mathematician and communication theorist at Lincoln Laboratory of Massachusetts Institute of Technology, engaged in technical studies for the Government. In addition to his technical research there, he devoted substantial time to studies of arms control and national security problems.

Dr. Brennan's serious interest in arms control began in 1957, when he was organizer of a group that led to the 1958 Summer Study on Arms Control held in Cambridge, Massachusetts, under the auspices of the American Academy of Arts and Sciences. In 1960 he was an organizer and co-director of the Summer Study on Arms Control, again held in Cambridge under American Academy auspices, in which some sixty experts participated. He was a member of the Academy's Committee on International Studies of Arms Control in 1961–66, serving as its chairman in 1961–62, and has been a frequent participant in international conferences relating to arms control.

Dr. Brennan has served as consultant to the Department of State, the Department of Defense, the Arms Control and Disarmament Agency, the Executive Office of the President, and is a member of a Task Force of the Defense Science Board. He is editor of the well-known anthology, *Arms Control, Disarmament, and National Security* (New York, George Braziller, 1961), sponsored by the American Academy of Arts and Sciences, and guest editor of its predecessor, the special (fall 1960) issue of *Daedalus* on "Arms Control". He is editor of the new international journal *Arms Control and National Security* and has edited studies of future military technology. He has contributed articles on arms control to a number of

journals, and has lectured on national security subjects at Harvard, Massachusetts Institute of Technology, the University of California, and defense study centers in London, Bonn, Paris, and Oslo, among others, and has given seminars on arms control in Moscow.

Born in 1926, Dr. Brennan received the B.S. (1955) and Ph.D. (1959) degrees in mathematics from Massachusetts Institute of Technology, where he was a Gerard Swope Fellow and received other graduate and undergraduate prizes and awards. Prior to entering M.I.T., he was engaged in radio engineering as a registered professional engineer in the State of Connecticut. He is a Senior Member of the Institute of Electrical and Electronic Engineers and a member of Sigma Xi, the American Mathematical Society, and the Institute for Strategic Studies, London. He was a member of the President's National Citizens' Commission on International Cooperation Year in 1965.

Senator GORE. Dr. Brennan, we would be happy to hear you.

STATEMENT OF DR. DONALD G. BRENNAN, HUDSON INSTITUTE

Dr. BRENNAN. Do you wish to hear me next? I thought Dr. Rathjens was going to follow Dr. Panofsky.

Senator GORE. I changed the order because I thought since Dr. Panofsky had given us so generously of his time that maybe it would be appropriate to hear a supporter of the ABM.

Dr. BRENNAN. All right.

Mr. Chairman, and members of the committee, it is a privilege for me to appear before you. The last time I was thus privileged was when I appeared before the sessions of the full Foreign Relations Committee in 1963 to record my support of the nuclear test ban treaty. I appreciate your willingness to hear me in this present setting, to set forth some views I know some of you now oppose. It is encouraging that there may still be some open minds.

BACKGROUND OF WITNESS

Let me tell you something of my background for speaking on ballistic missile defense, which I shall call BMD for short. My main professional background and training were technical, and came primarily from MIT, with which I was associated in various ways from 1951 to 1962. However, I acquired a strong interest in arms control and other aspects of national security policy beginning in about 1957. I joined Hudson Institute as its first president in 1962 and continued in that capacity to 1964, when I resigned the presidency but continued there since to conduct studies of arms control and other problems of national security policy. I edited, and wrote part of, the special issue of Daedalus on arms control—fall 1960—and its successor book version titled "Arms Control, Disarmament, and National Security" published by George Braziller in 1961, a book that was endorsed by Senator Fulbright, among others.

I have continued to write frequently on such matters and I now edit the new international journal titled "Arms Control and National Security." I have been following the technical developments in BMD for about the past 12 years and have closely studied the strategic and political implications for about the past 6 years. A more detailed biographical sketch is attached at the end of my statement. (See page 397 of hearing record.)

It might be useful to remark that my first widely circulated paper on missile defense was a satire written in 1958, called Project Turn-

about, that implicitly ridiculed some of the technical possibilities for missile defense then being studied. I was opposed to the deployment of BMD to protect cities until about the middle of 1964. Since then I have tended to favor such deployment, though not necessarily any possible program at any possible time.

I should like to stress that I am appearing here purely as an individual, and I do not speak for anyone else at Hudson Institute, nor for anyone in the Government or elsewhere. This is especially important to stress because I shall advocate a more substantial defense of cities than the deployment currently recommended by the administration, and you should not blame them for my views.

Let me now turn to the substance of the issues before us. I should perhaps warn you that some of the things I shall say are quite different from the statements you have been hearing.

Senator CASE. Would you read just a little more slowly for the benefit of the audience.

Senator GORE. Don't you have a copy?

Senator CASE. Yes, I have a copy but most of the people who are hearing you don't have copies.

POSSIBLE APPLICATIONS OF BALLISTIC MISSILE DEFENSE

Dr. BRENNAN. Broadly speaking there are two main possible applications of ballistic missile defense: for the protection of strategic nuclear offensive forces, and for the protection of people and civil resources. The program announced by President Nixon on March 14 has elements of both kinds. The program is intended to lead to a defense of offensive forces that would protect at least some of those forces against a substantial Soviet attack. And it is intended to provide substantial protection of the population against a modest attack, of the sort the Chinese might be able to mount in the 1970s or that might result from unauthorized launch of a portion of the Soviet force. The component intended to protect people is of a kind called "area defense" and is based on the long-range Spartan missile; it would not provide very much protection against an overwhelming Soviet attack.

PROTECTING OFFENSIVE FORCES

I shall come back to the subject of city defense, to which the bulk of my statement is devoted, but let me mention a few thoughts about protecting offensive forces. I have not reviewed all of the detailed considerations that led to the new program, but those I did review made it appear that the decision was sound. However, it has in any event been clear for some few years that Soviet offensive force developments might at some time require improvements in the protection of our own offensive forces, and it should not be surprising if that time is now upon us. The Department of Defense has conducted major studies of alternative means of improving this protection and it has always been clear that BMD was one of the potentially attractive alternatives. Many or most of the critics of BMD for cities—at least among those with some sophistication—have been potentially or actually willing to support BMD for offensive forces; for example, Hans Bethe, in his statement to this committee on March 6, said that he was in favor of it.

It may be useful to separate sharply two questions about protecting offensive forces. First, to what extent in what circumstances is an increase in that protection justified? Second, what is the best means of increasing that protection? The second question is of a highly technical nature not well adapted to public, or even congressional, inquiry, and some of the arguments being heard about BMD probably belong to the first question. For example, if someone says he is opposed to BMD for offensive forces because he would rather spend the money on social programs, it is not always clear if he would equally oppose spending perhaps even more money on superhard silos or on a rail-mobile deployment system for Minuteman.

It is possible to conceive that the detailed scale and timing of expenditures for protecting offensive forces could properly come under congressional scrutiny, though this would represent a new thing and I am not sure I should favor it. It would in any event have to be done in executive sessions, with sensitive information. It does not seem at all feasible to me to have such scrutiny of the decision as to the best means of providing the protection. The judgment about the best means should be based on a complex of factors that can scarcely be grasped whole by a full-time Secretary of Defense. That a committee of the Congress could meaningfully penetrate such a judgment seems to me most unlikely.

There are, however, some very important questions that are highly appropriate for congressional consideration, and I shall return to these.

CITY DEFENSES

Let me now turn to the subject of city defenses. The new administration program is aimed at developing, in an evolutionary way, an area defense that would protect the country against light attacks. It seems to me that beginning the program in this way, at least in general terms, is eminently sensible. However, it also seems sensible to me that the program should ultimately evolve toward a system that would provide more substantial protection. The discussion of these possibilities has become polarized between the terms "thick" and "thin," which is unfortunate because there is a continuous spectrum of possibilities; however, I do favor something "thicker" than the "thin" area defense.

In this regard, I seem to some extent to be on the side of Senator Gore. Senator Gore said, in the secret Senate debate on BMD on October 14 last, as printed on page E9650 of the Congressional Record for November 1:

"We have three choices: First, not to deploy; second, to deploy a thin or reasonably effective—maybe—system; or, third, to proceed to deploy vigorously what we would hope to be an effective defense.

"We have chosen here the middle course. It is, in my view, the least advisable course. I would have greater trouble in reaching a decision as between not deploying at all and deploying an effective system. I have little trouble with opposing the deployment of a reasonably effective system. I believe it carries with it many of the disadvantages—politically, militarily, and so forth—and carries few of the positive advantages of an effective defense."

The main positive advantage of what Senator Gore called "an effective defense" is, of course, that it might save tens of millions of American lives in the event of a major war, and make an enormous

difference in the ability of the country to recover. I have attached to my statement, for insertion in the record, a paper titled "The Case for Missile Defense," in which the arguments for an effective defense are set forth. (See page 465 of appendix.) This paper is similar to an article of mine of that title just published in the April 1969 issue of Foreign Affairs, but the attached version has a few more details. I shall here, simply summarize in outline form the main points that seem to me to emerge from that analysis.

MAIN POINTS OF MISSILE DEFENSE

1. It appears that BMD systems costing less than half the cost of our present air defense system might (in the context of wars that could possibly occur in the mid-1970s and later) reduce U.S. fatalities from levels approximating half the populace to levels approximating 10 per cent of the populace, and, by protecting perhaps 90 percent or more of U.S. resources in production and transportation, facilitate much more rapid economic recovery. There is some chance the system would perform much more poorly than intended, but also some chance it would perform much better. The expected performance would be substantially more important for the country than the expected performance of the air defense system in the past would have been.

2. The Soviets could wholly nullify such a defense only by expenditures on the general order of the cost of the defense itself, or, possibly, more. Thus, quite apart from the fact that much strong evidence indicates that the Soviets are not determined to nullify any and every defense we might build, they would face substantial budgetary and bureaucratic problems in doing so. A partial offset of the defense would be less expensive, but correspondingly less of the insurance value of the defense would be nullified.

3. In view of the fact that a major research and development program on means of penetrating missile defenses has not in several years disclosed any cheap and reliable penetration technique against a good defense, the estimates of the preceding two paragraphs appear to have a stability that begins to approximate our confidence in the security of our best offensive weapons.

(As a parenthetical side remark, on purely historical grounds it should scarcely be surprising that the virtually untrammeled superiority that the offense has enjoyed in the past two decades is beginning to be somewhat trammeled.)

FUNDAMENTAL OF DETERRENCE

4. As concerns the fundamental of deterrence, it is not a basic requirement of U.S. national security that we be able to kill 74 million Soviet citizens and destroy 76 percent of their industrial capacity, or whatever such numbers are selected, independently of the circumstances and of the Soviet ability to destroy the United States. The perception that we have such a requirement seems to have contributed to the (apparently false) perception that the Soviets have the same requirement, and this latter idea has contributed to putting us in our present posture, which has been aptly termed a posture of "Assured vulnerability" by Steuart Pittman. I do believe it is a U.S. requirement to be able to do at least as badly to the Soviets as they could to us, but this principle does not require a posture of "Assured

vulnerability," and would permit the deployment of defenses in both superpowers, at least within substantial limits. The original justification for the posture of the superpowers in past years—that we had to deter because we could not defend—seems to have become distorted in some minds into the false idea that, because we must deter we cannot defend.

5. If for no other reason than that no foreseeable defense systems against prevailing offensive forces will reliably reduce hostage levels in the superpowers below several millions, the deployment of BMD will not significantly increase the likelihood of war. Because of the complexity a defense imposes on an attack, BMD seems more likely to reduce this likelihood.

6. The propensities for offense-defense arms races would be dominated by prevailing United States and Soviet attitudes as long as defense appears to be sufficiently effective as to require comparable expenditure to nullify it. U.S. attitudes at present are mixed, with some favoring deployment of defenses and some opposed. Soviet attitudes seem much less mixed, indeed they seem almost universally to favor emphasis on defenses. Thus, it appears that similar U.S. emphasis on defense would probably be the most stable way of avoiding an offense-defense arms race as well as being most desirable from other points of view. The United States should stop responding to Soviet defenses with major increases in its own offensive forces, and respond instead with damage-limiting programs of its own; and senior U.S. spokesmen should most certainly stop trying to persuade the Soviets that they must respond to a U.S. defense by increasing Soviet offensive forces. The possibility of an offense-defense race could be further reduced with explicit, if informal, United States-Soviet understandings about strategic forces, giving first priority to controls on offensive forces, with second priority to constraints on defenses, or perhaps no limitation on defenses. However, as long as Soviet offensive forces remain at or above present levels, I do not believe the possibility of a substantial U.S. defense should be excluded by such an understanding.

The United States and the Soviet Union clearly have a large common interest in reducing the scale of potential damage that could result from a war. This common interest is at the heart of arms control. We do *not* have a common interest in *precluding* the possibility of limiting damage.

That completes my summary of the strategic issues as I see them.

CONGRESSIONAL CONSIDERATION OF CERTAIN DEFENSE POLICY QUESTIONS

I should like now to return to the matter of which questions in major defense policy seem to me appropriate for congressional consideration. I have already indicated that some do not seem appropriate, such as the selection between alternative weapon systems that would accomplish similar objectives. You may occasionally wish to review the Department of Defense for their general competence in handling such matters, but you cannot generally do that kind of work for them.

There are, of course, several kinds of decisions where it has long been recognized that a congressional role is vital.

Senator GORE. May I interrupt; you just made a statement, in referring to the role of the Congress, "You may occasionally wish to review the Department of Defense for their general competence in handling such matters, but you cannot generally do that kind of work for them."

We are not attempting to do their work. But in this case, when they undertake to deploy a system that was originally designed for city defense and adapt it for defense of hard points, don't you think it is necessary before such a program is enbarked on that the Congress review it?

Dr. BRENNAN. Yes; you may, indeed, wish to review a question of city defense, and I was just going to get to that, sir.

Senator GORE. All right.

Dr. BRENNAN. One can, as Dr. Panofsky indicated, make a defense more narrowly concentrated on the offensive forces——

DISTINCTION BETWEEN CITY DEFENSE AND HARD-POINT DEFENSE

Senator GORE. With three very eminent men here it is very difficult to obtain the full benefit of them. Would you mind at this point commenting upon the distinction which Dr. Panofsky draws between city defense and hard-point defense?

Dr. BRENNAN. I should like very much to comment on several of the things that Dr. Panofsky said, but I think perhaps I can do it in the most orderly way if I do finish the statement first, and I am nearing the end.

Senator GORE. All right, fine.

WHERE CONGRESSIONAL ROLE IS VITAL

Dr. BRENNAN. There are, of course, several kinds of decisions where it has long been recognized that a congressional role is vital. These generally involve important interactions between the Defense Department and the citizenry as a whole. For example, the overall level of the defense budget is a major factor in how heavily we are all taxed; draft policies influence which of our young men shall serve, and for how long; and the general kinds of forces we maintain will relate to the foreign policies the administration is permitted or encouraged to pursue. Such examples are easy to multiply.

I should like to suggest to you that there is one area of decision that has not previously been recognized explicitly as one of congressional concern, but which seems to me at least potentially appropriate. One of the two most important points I wish to make to you in this statement is to suggest that explicit consideration might well be given within the Congress to the relative emphasis to be given to strategic offensive forces, on the one hand, and strategic defenses on the other.

From the early 1950s until 5 or 6 years ago, the technical prospects for an effective defense did not seem very bright, and we became accustomed to protecting ourselves primarily by deterrence—the threat to destroy others if we were attacked. Now, however, it begins to appear feasible to shift an increasing degree of our protection to active defense—the ability to reduce the consequences of an attack.

It will not be possible for the foreseeable future to shift complete reliance to defense, but important differences of degree appear quite possible. The strategic debate of the recent past has not generally been carried on in these terms, but I believe this is the proper framework.

The reason this area may be appropriate for congressional concern is that it involves an important interaction between the Defense Department and the citizenry as a whole, namely, what fraction of the population and the resources of the society should be at risk in the unlikely event deterrence fails and there is a major war. Stated another way, one may view the procurement of defenses as something like insurance, and the question of how much insurance is enough, in view of the costs and risks involved, is one that is plainly appropriate for a political process. Of course, it will be clear to you that, as an expert, I have my own views on this matter. But it will also be clear to you that, as an expert, I have found the quality of the treatment of this problem by the administration in recent years very disappointing.

There would be some potential difficulties in attempting to address this problem directly in a political framework. However, I believe that untutored public opinion in this area may be at least as reliable a guide for general policy direction as more sophisticated but basically superficial theories that are sometimes compounded with false information. For example, although the overwhelming majority of public statements concerning BMD in recent months have opposed deployment, the Harris survey released February 3 reported that people favor a buildup of a system of antimissile defenses by 61 to 23 percent, or almost 3 to 1. It is not clear, but presumably likely, that the people interviewed were thinking at least implicitly of city defenses.

THEORY OF STRATEGIC DISARMAMENT

The other of the two most important points I wish to make here concerns disarmament. I have read most of the other statements presented to you in these hearings, and I do not find that there has been much discussion before this Subcommittee on Disarmament Affairs of the subject of disarmament. The reason for this may well be that, as the only witness you have heard who is advocating what Senator Gore called an effective defense, I may be the only one you have heard who has a plausible theory of how you can do a lot of strategic disarmament. You can do it with defenses. Let me sketch roughly how it might go, complete with a possible timetable.

We might begin at once with a Soviet-American understanding about a ceiling on offensive forces, expressed in inspectable terms such as gross weight, and an understanding that we might both build up defenses. Such an agreement is clearly in the common interest of both the United States and the Soviet Union and should prove realizable. By the mid-1970s, if the defenses are in place and appear to have the capabilities now expected of them, there should be enough confidence in them to begin some gradual reductions of the offensive forces on both sides, reductions which would require only modest inspection because the defenses would—if suitably deployed—sharply diminish the effectiveness of clandestine missiles. The defenses would then become even more effective against the then-reduced offensive-force threat, which would facilitate further reductions in offensive

forces. Just how far this process might go would depend on the technological and political circumstances than prevailing, but I should not be surprised to find that by 1980 one might reduce the risk of Soviet-American strategic nuclear war to negligible proportions. The defensive forces themselves might, of course, be reduced along the route, but not eliminated. It should be clear that there would be some effective "disarmament" of the offensive-force potentials as soon as the defenses were working, even before direct reductions of the offensive forces.

In contrast, I do not believe any of the distinguished witnesses who preceded me have even the beginning of a plausible program for achieving major disarmament of the offensive forces by 1980. I believe it can be virtually guaranteed that it will not prove possible in this time period without substantial defenses. I should mention that following the program sketched here might lead to a strategic situation outside the range analyzed in my appended paper, but presumably it would actually go that far only if it appeared feasible, as I believe would be likely.

In addition to my own paper, I have attached a recent paper by my colleague Mr. Johan Holst, who has translated a recent article from Izvestia on American BMD and provided a brief but very persuasive commentary on current Soviet perspectives on the subject. And I think this commentary will relate to the quotation you had from the New York Times just a few minutes ago.

(See page 477 of appendix.)

Dr. BRENNAN. That completes my prepared statement, and I shall of course be delighted to respond to questions and discussion. While I am fairly familiar with technical details, and willing to answer technical questions as far as I can, my primary expertise is in the strategic, political, and arms-control aspects of missile defense, and suggest that we should emphasize these areas if possible.

Senator GORE. Thank you.

Dr. BRENNAN. Thank you.

Senator GORE. Doctor, yours is an engrossingly interesting statement which I want to reread. Because it is 20 minutes to 12, maybe we should hear Dr. Rathjens and then consult you all as a panel.

It certainly is not for any lack of questions and interest in your statement. It is very ably presented.

Dr. George Rathjens, now visiting professor of political science at Massachusetts Institute of Technology was until June 1968 director of the Systems Evaluation Division of the Institute for Defense Analyses and before that, special assistant to the Director of the U.S. Arms Control and Disarmament Agency.

(The biographic sketch follows:)

BIOGRAPHICAL SKETCH OF GEORGE W. RATHJENS, JR.

Dr. George W. Rathjens, Jr. is presently Director of the Weapons Systems Evaluation Division of the Institute for Defense Analyses.

From 1964–65 Dr. Rathjens was special assistant to the Director of the Arms Control and Disarmament Agency; 1962–64, Deputy Assistant Director of the Arms Control and Disarmament Agency; 1960–61, chief scientist for the Advanced Research Projects Agency, Department of Defense; 1961–62, deputy director; 1959–60, staff, Special Assistant for Science and Technology to the President; 1958–59, research fellow, Harvard University; 1953–58, science advisor, Wea-

pons Systems Evaluation Group, office of Secretary of Defense, and 1950–53, instructor in chemistry at Columbia University.

In his present position Dr. Rathjens specializes in thermodynamics; molecular structure; and operations analysis.

Dr. Rathjens has a B.S. in chemistry from Yale University and a Ph.D. in chemistry from the University of California, Berkeley.

It has been my pleasure to be with Dr. Rathjens in Geneva and other places. I know of your competence, Doctor, and it is with particular personal pleasure that I welcome you to the committee. You may proceed.

STATEMENT OF DR. GEORGE W. RATHJENS, JR., VISITING PROFESSOR OF POLITICAL SCIENSE, MASSACHUSETTS INSTITUTE OF TECHNOLOGY

Dr. RATHJENS. Thank you, Mr. Chairman and members of the committee.

I welcome the opportunity and am honored to appear before you to comment on the question of our deployment of an antiballistic missile defense system. I have an advantage over most of the other opposition witnesses whom you have heard in that since they have appeared the President and members of his administration have spoken on the subject.

The nature of the new deployment is now known in at least its broad outlines as re the President's views about the objectives and implications. I will focus my attention mainly on that deployment, and on some of the administration statements regarding it.

ABM QUESTION PART OF OUR STRATEGIC POLICY

Before doing so, however, I should like to make it clear that I share many of the views and reservations of other witnesses whom you have heard. I do not believe the ABM question can be intelligently considered apart from other aspects of our strategic policy. Thus, it seems to me that Dr. Killian's suggestion of a thorough, independent review of our whole strategic posture and the objectives to be served by it is an excellent one. And, I share the concerns of Drs. Bethe, Kistiakowsky, Ruina, and York about the possibility of a catastrophic failure of the defense; about the need to delegate responsibility for launch of interceptor missiles to low-command echelons or the computer if there is to be any chance that the system will be effective, especially in coping with accidents; and about the unrealism of assuming that the system could provide anything like a damage denial capability against a Chinese threat. Their statements regarding these points apply just as forcefully to the new deployment plan as they did to the old.

Because the President and particularly Messrs. Laird and Packard have placed such emphasis on Minuteman defense in the new plan, and because that subject has not been dealt with very fully by other witnesses, I would like to devote a major portion of my testimony to it.

I might interpolate parenthetically here that I prepared the statement before you heard from Dr. Panofsky. You will notice a remarkable coincidence in our views. It is not due to collaboration but I think due to the fact that almost any technical person who has examined the

utility and the capabilities of this defense system particularly for the defense of Minuteman, would have very similar reservations to those that both of us have.

Well, two questions must be asked: (1) Are our strategic retaliatory forces likely to be so vulnerable to preemptive attack in the near future that a decision must be made now to remedy that vulnerability? (2) If so, is the deployment of the proposed Sentinel ABM defense for Minuteman the preferred way of dealing with the problems?

The administration's decision implies an affirmative answer to both questions. In my judgment the answer to both is almost certainly negative.

Senator FULBRIGHT. May I interrupt to ask you if this was prepared before they changed the name to Safeguard or is your statement applicable to what is now called Safeguard?

Dr. RATHJENS. Senator, I intend this to be applicable to the present system, and it was prepared just a few days ago. I may be in error in referring to it still as Sentinel.

Senator FULBRIGHT. They have begun to refer to this new program as Safeguard so we want to be sure we are talking about the current proposal.

Dr. RATHJENS. I am indeed talking about the current proposal; yes.

Senator GORE. Have you noticed any change in technicalities of the system or is it just a change in the name?

Dr. RATHJENS. Yes, it is.

CAPABILITY OF OUR STRATEGIC FORCES

I would first note that our strategic forces now have the capability to deliver over 4,000 nuclear warheads against an adversary. Less than one-tenth of that force could, according to former Secretary of Defense McNamara, destroy over 75 percent of the industry and 30 percent of the population of the Soviet Union, the latter figure being almost certainly a low estimate since it is based on immediate and easily calculable fatalities with those that are delayed and difficult to quantify being neglected. During the time when Sentinel or Safeguard is being deployed the number of warheads our strategic force can deliver will be increased to 10,000 or so assuming implementation of present plans to replace large fractions of our Minuteman and Polaris force with new missiles carrying several warheads each. Even without adding to this the fact that we also have several thousand nuclear warheads in Europe, some of which could be delivered by tactical force against the U.S.S.R., a preemptive strike against us in the mid-1970s would seem like madness on the part of the Soviet leadership unless they could have extremely high confidence of being able to destroy at least 95 percent, and more likely 98 percent, of our retaliatory force.

FIRST STRIKE CAPABILITY OF SOVIET UNION

I would not claim that the development by the Soviet Union of such a first-strike capability is impossible, but it is at worst a distant prospect. It could come about through the development of all of the following, and I emphasize all of them. First, a capability to deliver very large numbers of warheads with extreme accuracy; (2) an extraordinarily effective antisubmarine warfare capability.

Senator GORE. What do you mean there? Do you mean in order to knock out 95 to 98 percent of our retaliatory capability by the late 1970s they would have to have as many as 8,000 or 10,000 weapons which could seek out individually that many weapons? What do you mean?

Dr. RATHJENS. Well, not necessarily; it would only take one weapon to knock out a Polaris submarine, for example. The problem would be to find it, and I think that would be very difficult. What I am suggesting here is that what is required of them is a simultaneous development of a large number of capabilities which I see no evidence that they now have, and all of those things would have to occur before they could begin to have any confidence in being able to knock out our retaliatory forces.

Senator GORE. And they would all have to work simultaneously?

Dr. RATHJENS. They would indeed have to all work very nearly simultaneously, because it would hardly do them any good to sink a few Polaris boats if others survived even for a few hours. It would require an extraordinarily effective, entirely coordinated capability on their part, which I see no possibility of.

Let me skip the rest of that paragraph, since I think I have just covered all of it except the last point, which would be to the effect that I believe development of the kinds of capabilities we are talking about would be evident to us for the most part through our intelligence collecting capabilities well before they were operational.

Thus, the determination that action is now needed to cope with a potential mid-1970 threat to our retaliatory capability seems decidedly premature. I know of no basis for believing that the concatenation of events required to place our retaliatory forces in jeopardy by the mid-1980s is even a remote possibility.

Though the President did not, in his Sentinel announcement, refer to Soviet intentions to develop a first-strike force, Secretary Laird has made much of that possibility. Indeed, he has claimed it as an absolute fact, apparently based not so much on the Soviet capabilities or even hard estimates of future capabilities as on his conclusion that there can be no other rational explanation for the Soviet SS–9 program. To me there would seem to be at least two others that are plausible: the desire to have some ICBMs that can carry warheads that are well matched to the size of American cities (which are much larger in area than those of the U.S.S.R.); and a possible Soviet desire to have a large number of boosters that could be efficient carriers of multiple warheads or other aids to facilitate the penetration of a possible large-scale U.S. ABM deployment.

Senator GORE. I would like to break in here just to suggest that we, too, had a very large carrier of our own, the Titan II.

Dr. RATHJENS. Yes, indeed; yes.

Senator GORE. I wonder why, if the SS–9 is such a great stride forward, we quit making the comparable Titan II?

Dr. RATHJENS. I don't see any great difference between those two missiles, Senator, between our Titan II and their SS–9.

CAPABILITY OF SOVIET SS–9

Well, it is probably worth considering briefly the actual SS–9 capabilities for attacking our Minuteman force. According to Mr. Packard the SS–9 force might number 500 by 1975. Clearly a force of

that size would not be a serious threat unless multiple individually targetable reentry vehicles (MIRVs) were employed since even with perfect reliability and accuracy it could destroy at most half the Minuteman force. With realistic degradation to take account of reliability, even a force two to three times as large as Mr. Packard has suggested would not suffice to destroy enough Minutemen so that the survivors alone could not inflict unacceptable damage on the U.S.S.R.

Senator GORE. And that is making no reference to the submarines?

Dr. RATHJENS. None to the submarines and none to the aircraft.

Senator GORE. Nor to the tactical forces in Western Europe, nor weapons we have on foreign bases.

Dr. RATHJENS. That is quite correct. I am saying here the surviving Minuteman force alone would be sufficient for retaliation.

If one assumes that highly accurate MIRVs are developed by the Soviet Union and deployed on the SS–9s they might pose a greater threat. If the Soviets can do as well in achieving high accuracy as we apparently expect to do—according to figures released in late 1967 by former Deputy Secretary of Defense Nitze—then a 500-missile Soviet SS–9 force might destroy three-quarters of the Minuteman force. Again, the survivors alone would be more than enough to inflict unacceptable damage on the U.S.S.R.

Thus, one must assume a much larger force than Mr. Packard estimates, a more advanced MIRV technology than we expect to have ourselves—and so far we are probably leading the U.S.S.R.—or both if the SS–9 is to be a critical threat to Minuteman.

THREAT TO OUR RETALIATORY CAPABILITY

But, however tenuous the basis for the argument, the administration has clearly decided that our retaliatory capability may be threatened in the mid-1970s, and that action is now required to insure that it will not be. If indeed such an essential element of American strength as our retaliatory posture may be in jeopardy, I would suggest that defense of Minuteman using Sentinel components is hardly a high confidence solution.

Other witnesses who have appeared before you have testified on the question of the reliability of such complex systems as ABMs. Their testimony in itself should cause us all to have serious doubts about the wisdom of the decision. The administration is asking great forebearance on the part of the American public when it attempts to persuade them that our retaliatory capability is in jeopardy, and then offers as a solution to the problem a system in which they can have no more confidence than in Sentinel.

SENTINEL PERFORMANCE DOUBTED

However, even if Sentinel could be counted on with high confidence to perform exactly in conformance with specifications, there would still be reason to doubt that it would be a good solution to the question of possible Minuteman vulnerability.

It would be surprising if such a design were optimal or even close to it considering that the interceptor missile and radars were designed to defend very vulnerable cities rather than very invulnerable missile

sites. The problems of the two kinds of defense are fundamentally different. One can tolerate near misses in the case of a defense of Minuteman that would be catastrophic if they occurred near large cities. The design of the defense should take advantage of that fact.

The missile site radar (MSR) is probably particularly badly matched to a defense of missile sites. It will be highly vulnerable compared to the ICBM sites themselves, and hence will be a prime target for the attacker. Furthermore, it is so very expensive that redundancy is likely to be quite impractical. A "leaky" defense that might be quite satisfactory for protecting ICBMs themselves will hardly be satisfactory. Rather one must have the same kind of perfect defense of the radars that would normally be required for cities, for if the radars are destroyed the whole defense collapses and the missile sites are as vulnerable as if there had been no defense at all. Thus, the defense must, and I underline must, allocate a very large fraction of its efforts to defending radars. This is particularly awkward with the components proposed because of the very great geographic expanse of the Minuteman bases and the short—25 mile—range of the Sprint missile.

I have here a map that illustrates this. (Not shown.) This is a map of the base in Montana, and the distance from there to here is about 200 miles compared with the 25-mile Sprint radius.

This means that Sprints that are deployed to defend the radar cannot be used to defend the Minutemen that are on the periphery of the complex, and the Sprints near the periphery of the complex cannot defend the radars. Indeed, such Sprints would almost certainly never be of any use whatever since the offense would presumably not attack ICBMs near them until the radar had been destroyed.

SOVIET RESPONSE TO SAFEGUARD

Assuming the offense will know the Sprint deployment, and I see no reason why it won't, it can calculate with high confidence exactly the number of warheads required to overwhelm the defense by simply exhausting the interceptors. If it does so, and delivers that number in an attack against the radar, it is clear that with the defense deployment being considered, the cost of saving a single Minuteman missile is likely to be at least in the $25 million to $100 million range—compared to its procurement cost of perhaps $4 million. Because there has been some incredulity about such estimates I have appended some remarks to support it which I will not read. I have included a brief appendix in an effort to show that they are plausible. (See page 363.)

Slightly less conservative offensive tactics may make the results very much more unfavorable to the defense.

But that is not all. The foregoing assumes the Soviets use missiles to attack the radars that could otherwise be used to knock out Minutemen. They hardly need to do that. Instead they could effectively attack the vulnerable radars with whatever number of the more numerous, less expensive, smaller missiles would be required to exhaust the interceptors, conserving their more accurate, higher yield weapons for use against our ICBMs. If the Soviets chose such an attack option, and if the threat to Minutemen is, as alleged, from a Soviet SS–9 missile force, the defense would not be effective at all in saving Minuteman.

RESEARCH ON OPTIMIZED DEFENSE URGED

Before concluding my discussion of the defense of Minutemen, I should emphasize that I would not necessarily oppose a defense if it should appear that at a future date our retaliatory forces would indeed be in jeopardy, and if a defense could be built with components better tailored to the job required of them. A defense might well be preferable to some of the other options for strengthening our retaliatory capability such as simply multiplying the size of our ICBM force.

I would favor research on such an optimized defense, and I believe there is time for it. I would also like to see a vigorous program on other means of insuring the invulnerability of our retaliatory capabilities such as reducing the noise level of our sea based forces and extending the range of their missiles if they are indeed as threatened as Secretary Laird leads us to believe.

But above all, I believe the most effective, and I might say the cheapest, means of insuring that we can maintain an adequate retaliatory force is through the earliest conclusion of an agreement with the Soviet Union to curtail the strategic arms race.

EFFECT OF 12-SITE NATIONWIDE DEPLOYMENT

In concluding, I should like to comment briefly on two other aspects of the proposed Sentinel deployment, and I have in mind here the effect of the 12-site nationwide deployment, in contrast to the initial defense of Minutemen, that is, the whole $6.6 billion deployment. I am concerned that the nationwide deployment could well lead to an escalation in the Soviet-American strategic arms race, and that it could serve as an impediment to terminating that race.

First it is to be pointed out that the history of the strategic arms race has been one of each side reacting not so much to adversary capabilities as to fears of possible adversary developments. Thus, our original Sentinel decision appears to have been triggered not by the development of a Chinese ICBM capability, but rather by concern that such a capability might appear in the 1970s; and the President's decision to include a defense of Minuteman as a component of Sentinel is clearly being made in anticipation of the possibility that our retaliatory forces might some day become vulnerable. Two factors dominate this action-reaction phenomenon; The need to react in an anticipatory way because of the leadtime required to deploy modern weapons systems; and the fact that the greater the uncertainty about adversary intentions and capabilities, the more likely will be an overreaction.

With these observations in mind, it would seem unlikely that the Soviet Union could totally discount the possibility that, despite our statements to the contrary, the United States might later attempt to expand its ABM system into one designed to blunt the effects of a Soviet retaliatory strike. Implementation of the announced plan would reduce the leadtime and facilitate such a deployment particularly as the components we propose to use for the modified Sentinel defense are for the most part identical to those proposed by the Army for the old Nike X deployment. Parenthetically, it is to be noted that there would be much less ambiguity about a defense specifically designed for defending hardened ICBMs; it would be far less likely to provoke an escalation of the arms race.

The determination that we should attempt to maintain a capability to defend against a possible Chinese attack will clearly be a further stimulus to the Soviet Union to increase its offensive capabilities for it implies a rapid and continuous upgrading of Sentinel on a nationwide basis as the Chinese threat evolves, and as technology changes.

UNCERTAINTY OF ABM PERFORMANCE

In this connection, it cannot be emphasized too strongly that perhaps the most disturbing quality of an ABM system is the extraordinary uncertainty that must apply to estimates of its performance. This has been well brought out in the testimony you have heard, and by comparison of that testimony with the administration and contractor claims about expected performance. The sad fact is that while we can have almost no confidence in an ABM system's working, an adversary can have almost no confidence that it will not work. Thus, we must expect the Soviet Union to react to even a "light" or "thin" deployment as we have to their Moscow defenses by very substantially improving offensive capabilities, not because an ABM system will be effective and not because it will be expanded, but simply as a conservative hedge against those possibilities. The result will almost certainly be an expensive expansion in the arms race with no increase in protection, and, indeed, possibly with a diminution in security for both sides.

EFFECT OF ABM ON EFFORTS TO LIMIT ARMS RACE

The deployment of the proposed ABM system is also likely to impair our efforts to limit the arms race by mutual agreement. The difficulties lie in a formulation of a definition of "thinness" that might be applied to systems that would be permitted under any agreement, and in the establishment of mutually acceptable procedures for verifying that systems were not being dangerously upgraded in their capabilities. Without verification arrangements that would probably be unacceptably intrusive, I doubt whether we could ever have adequate confidence that a nationwide Soviet ABM system was of such limited capability that we could accept a lengthy freeze on our strategic offensive capabilities. The point is well-illustrated by our experience with the Soviet Tallinn system. For years there was dispute in the U.S. intelligence community about whether that system had an ABM capability at all. How much more difficult it will be to establish limits on the capability of a system that is clearly designed as an ABM system.

SUMMARY

In summary, I believe that if we go ahead with the Sentinel deployment, as modified by the new administration, we will be acting unwisely.

Inclusion of a defense for Minuteman seems to be based on a much exaggerated view of the threat to our retaliatory capabilities, and is definitely premature. Moreover, the defense proposed would be at best marginally effective in saving Minuteman.

The nationwide defense is hardly one in which we can have much confidence. Accordingly, it will be of little, if any, utility in expanding

the range of options we will have for dealing with Chinese bellicosity. And because of the command and control problem it would be very likely of little utility in preventing damage to us from accidental nuclear attack.

Thus, we will be buying very little if anything in the way of increased security, but we will be paying a very great price, both in dollars when they are sorely needed for other purposes, and in complicating our efforts to curtail the Soviet-American arms race by mutual agreement. We will very likely have missed a great, and I might say fleeting, opportunity to take a new direction in dealing with that problem.

Thank you very much for the opportunity to appear before you.

(The appendix to Dr. Rathjens' statement previously referred to follows:)

Appendix

Defending Minuteman Missiles with the Modified Sentinel System

The Administration has stated that the total cost of its modified twelve-site Sentinel plan will be 6.6 billion dollars. Seven of the sites, including the first two at Great Falls, Montana, and Grand Forks, North Dakota, will have perimeter acquisition radars (PARs) and will therefore be more expensive than the five that will not. The Montana and the North Dakota sites are likely to be the most expensive of all not only because they will have PAR radars but because they and two other Minuteman defense sites to be installed later will, according to Secretary Laird, have a considerably larger number of Sprint missiles than the others. Thus, it is probably reasonable to assume that the costs to be allocated to the first two sites should be 700 to one billion dollars each.

It is unlikely that either will have more than 75 Sprint missiles considering that the Administration has announced that the number of Sprints would not be increased significantly over the earlier plan, and that all twelve sites are now to have Sprint defenses.

If our interceptors could be counted on to work perfectly, the largest number of incoming warheads that could be intercepted would then be 75 at each base. Because the missile site radars (MSRs) are not likely to be more than one tenth as hard as our Minuteman silos, the adversary could destroy an MSR using warheads of one tenth (or less) of whatever yield would be required to destroy a Minuteman missile, assuming the same accuracy for both the small and large warheads. This means that an adversary booster carrying multiple warheads could carry about three times as many "radar-killing" warheads as it could "ICBM-killing" warheads.

If the interceptors at each base could destroy at most 75 incoming warheads, then at most 25 Minutemen would have been saved if the adversary were to use some if its missiles to attack the MSR. This follows because the boosters carrying the 75 "radar-killing" warheads could be used to destroy at most 25 ICBMs.

Thus, the cost per Minuteman saved will be 28 to 40 million dollars.

There are many reasons why this estimate is likely to be much too low.

1. If some of the Sprints are deployed too far away from the MSR to defend it, or if there are fewer than 75 Sprints per base, the costs per Minuteman saved could go up sharply—perhaps several-fold.

2. If the Sprints are believed to be less than 100% reliable, at least two would probably have to be allocated to intercept each incoming warhead that might destroy the radar, the effect being to double the cost per Minuteman saved.

3. If the adversary warheads did not have a kill probability of one against the Minuteman (or the radar), the number of Minutemen saved will be decreased assuming, as is likely, that at least some warheads that would have gone wide of their marks would nevertheless have been intercepted.

4. If, after review, the Administration should decide to terminate the program after completing only the Montana and North Dakota bases, then all of the development and production tooling costs would have to be written off against just the two sites.

5. While we might hope that the Administration's $6.6 billion estimate is correct, costs of similar programs have generally escalated upon implementation.

Considering these reasons, the 28 to 40 million dollar figure above should be multiplied—perhaps by a factor of three to ten. Obviously then, an estimate of 25 to 100 million dollars per Minuteman saved is very conservative.

Two arguments can be made against the foregoing line of reasoning:

1. It can be said that the discussion neglects the effects of Spartan missiles in degrading an adversary attack. On technical grounds this seems like a reasonable approximation. While the offense would of course have to allocate some effort to insuring penetration of Spartan defenses, it would hardly be enough to change significantly the above estimates. In any case, the Administration can scarcely argue otherwise since, in claiming as it has that the Soviet Union need not react to a nationwide Spartan defense by improving its offensive forces, it has implicitly acknowledged Spartan's inutility as a defense against a sophisticated attack.

2. It can be argued that the discussion fails to consider the bonus effect implicit in the fact that the sites at Grand Forks and Malstrom would offer protection of population against Chinese attack. It is probably reasonable to neglect this considering that the relatively small cities in this area, particularly in the area protected by the Malstrom site, would be unlikely to be hit by the Chinese, in view of the fact that they could as easily attack other far more populous targets, which initially would not be defended at all.

COMMENTS ON DR. RATHJENS' STATEMENT

Senator GORE. Thank you very much.

Now we will have approximately 30 minutes to question all of you. Dr. Panofsky, I would like to have both you and Dr. Brennan comment on the last paragraph of Dr. Rathjens' statement.

Dr. PANOFSKY. I agree with this statement, although I would feel that phase I of the Sentinel deployment should not be a major impediment to the forthgoing discussion. I do agree with the statement which relates to its effectiveness and the fact that very little is bought for a very great price and we surely have need for the dollars for other more pressing purposes.

Senator GORE. Dr. Brennan.

Dr. BRENNAN. I disagree with the statement there about every way it is possible to find disagreement.

First, I think it is incorrect as a technical estimate of what the Safeguard system would do for the protection of the offensive forces.

Second, it is not at all obvious that Dr. Rathjens would be equally reluctant—perhaps it is, I guess I shouldn't say that, it is not obvious if he would be equally opposed to installing, say, superhard silos that would cost the same money; I gather from your remarks you have a general reservation about increasing the protection of the offensive forces.

Dr. RATHJENS. It seems to me grossly premature.

EFFECT ON ARMS CONTROL TALKS

Dr. BRENNAN. Let me then pass to the more important disagreement I have, which has to do with the question of whether it complicates our effort to curtail the Soviet-American arms race by mutual agreement.

I do not believe that it complicates that effort. I believe, as I indicated in my own statement, that the appropriate direction for us to take in arms agreements with the Soviet Union is to arrive at an understanding that we might both deploy defenses and curtail the offensive forces. That is what I think would provide a new direction that we could take at this time, and that is quite a different direction from that which Dr. Rathjens advocates.

Senator GORE. Dr. Rathjens, would you like to rebut that?

Dr. RATHJENS. I don't think so, Senator. I have made my case. I think not.

Senator GORE. Dr. Panofsky, do you have some further comment?

Dr. PANOFSKY. Yes. I think that even if one can make a plausible scenario in which having defenses on both sides would be a possible component of an arms limitation agreement, I believe that a unilateral increase of a defense on one side before such negotiations have started will certainly complicate our efforts in reaching an agreement quite independent of what final solution one wishes to take.

Senator GORE. Dr. Brennan.

Dr. BRENNAN. In a sense I agree at least partially with Dr. Panofsky's last remark.

I have advocated myself for several years, in fact, that we should begin serious discussions with the Soviets about suitable mixtures of offensive and defensive forces and I think we could have been carrying on these discussions for some time in the past and have missed some opportunities to do so.

I do not think that it appears now as if it will take forever to get such discussions started, and I do not think the kind of beginnings that are likely to be made on a defensive program currently would interfere with those discussions in the foreseeable future, and it is not my expectation that the Soviets, for instance, will be willing completely to abandon strategic defenses as a result of those discussions. So I would anticipate as a result of those discussions that we probably shall have at least some defenses.

It is my view that we should both have some defenses, and I don't think there is any serious problem caused by starting on a defensive program now, at the same time we are about to begin the discussions with the Soviets.

May I comment a little bit on some of the technical points that Dr. Panofsky made before.

Senator GORE. I think before we leave this particular point let us conclude this and come to that later.

Senator Case.

Senator CASE. I think this is really the heart of the most important issue. Will this or will it not have an important effect, either in reducing the chance for effective disarmament or enhancing it?

Senator GORE. And enforcing it.

Senator CASE. And, of course, the enforcement of any possible agreement is perhaps the overriding factor in determining the possibility of making it, because we certainly are not going to make an agreement that is neither self-enforcing nor enforceable. You are in favor in general of ballistic missile defenses but you don't think very much of this Safeguard proposal, isn't that correct?

Dr. BRENNAN. Well, I think that isn't quite correct.

Senator CASE. You would rather have a population defense?

Dr. BRENNAN. I would rather have a heavier population defense than the one that has been currently talked about. That is not to say I would oppose any intermediate step toward that possibility, and I certainly do not oppose active defense to protect the offensive forces, and there, I think, I have some technical controversy with Dr. Panofsky.

Senator CASE. Thank you.

FAVORING DEFENSE OF HARD SITES

Senator GORE. Before we come to the technicalities, let me point out that there seems to be a thread of agreement among all three of you that under certain circumstances you would favor a defense of hard sites. All of you are nodding in the affirmative, I believe.

Dr. RATHJENS. I am not sure, Senator. I would at least favor a research program to see if that might be an interesting avenue. But for my part, I have frankly a great deal more confidence in our ability to maintain the invulnerability of the Polaris force than in our ability to ever develop a very effective defense of Minuteman. In a budget where there was a rationing of dollars, and if there were any serious threat to the total retaliatory capability, I would very much prefer to put the money on remedying whatever problems there would be with Polaris. So I would think that the defense of Minuteman is something that should be investigated in a research program, I should say research, not development. I don't think we are even at the point where we would want to go into development yet.

Senator GORE. What would you other gentlemen think about his observation that we must take some action now to preserve the integrity of our deterrence, which is really the only reason advanced for this ABM system. This business of an anti-Chinese defense has been forgotten as chaff in the wind. The thrust of the argument here is that the deployment proposed is necessary to preserve the integrity of our deterrence.

Would it be more feasible, would it be more economical, would it be more effective, to do it by way of sea forces? Would you comment, Dr. Panofsky?

Dr. PANOFSKY. I do not know. Since a special hard-point defense system has not been designed as yet in detail, I would not say whether it would be more or less economical but I would like to state that it is very important to design, and if it appears necessary, to develop a hardpoint defense because it is not only a question of dollars, but also a question of protecting our forces without increasing them in numbers.

Senator GORE. Leave out the economics. I shouldn't even have put it on that basis.

Dr. PANOFSKY. In our coming negotiations with the Soviets, we may wish to accept restraints on the numbers of missiles, either sea based or land based which we might be deploying and, therefore, having the option in these negotiations to preserve our deterrent in a way which does not increase the numbers of missiles, would be very valuable. For that reason I feel that having a realistic hard-point defense available as a technical option would be a good thing both from the point of view of preserving the deterrent in the long run and also from the point of view of having a larger spectrum of options available to us in our negotiations with the Soviets.

Senator GORE. Dr. Brennan.

Dr. BRENNAN. Well, I doubt if we can get into a very detailed discussion here of all of the factors that would influence the choice of which alternative means would be best to protect the retaliatory force. I understand that was the question you asked, isn't it?

I would return to a point I made in my statement that so far as I was able to review the factors that went into this decision, the decision seemed to be sound as concerns the protection of the offensive

forces. In that regard, by the way, I would emphasize something that Dr. Panofsky spoke of at some length, that was apparently not stressed in Dr. Rathjens' statement, and that is that the Safeguard program as presently conceived would provide a lot of protection for bomber bases. Much of Dr. Rathjens' argument was directed purely to the Minuteman defense, and there quite a different set of things enter as opposed to bomber bases. Bomber bases is one of the difficulties I have with Dr. Panofsky.

Senator GORE. Senator Fulbright.

Senator FULBRIGHT. Thank you, Mr. Chairman.

ANTI-CHINESE ASPECT OF ORIGINAL PROPOSAL

Mr. Brennan, I had looked at your article in Foreign Affairs before I saw your statement this morning and I want to ask you about it. I quote from the first page:

"The system now being deployed—the Sentinel—has been identified"—in the first place, is it being deployed?

Dr. BRENNAN. You are speaking from the Foreign Affairs article?

Senator FULBRIGHT. Yes.

Dr. BRENNAN. Well, of course that was written in December and January primarily.

Senator FULBRIGHT. You are referring to the old Sentinel?

Dr. BRENNAN. That is right; yes, sir.

Senator FULBRIGHT (reading): "The system now being deployed, the Sentinel, has been identified as an anti-Chinese system, but much of the support (both inside and outside the Government) for the Sentinel system decision came from those who believed that the system would eventually have significant capability against large Soviet attacks. It seems very likely (and desirable) that whatever system finally emerges will eventually have such a capability and, therefore it seems appropriate to concentrate here on the actual policy issues this prospect presents."

In the first place that means that you didn't take seriously the anti-Chinese aspect of that proposal. Does it or doesn't it?

Dr. BRENNAN. Well, the answer to that is faintly complicated. I think there is no question but that Secretary McNamara desired that the original Sentinel program should be purely anti-Chinese, but Secretary McNamara was not the only one participating in the evolution of that program.

SUPPORT OUTSIDE GOVERNMENT FOR PROGRAM

Senator FULBRIGHT. Now you say that it had support both from inside and outside the Government. Could you identify any support outside the Government?

Dr. BRENNAN. For the original Sentinel program on that basis?

Senator FULBRIGHT. On the Safeguard.

Mr. BRENNAN. For instance, myself.

Senator FULBRIGHT. Can you think of any others?

Dr. BRENNAN. Oh, yes. There are quite a few people who were, but I would be reluctant to name them in the circumstances.

Senator FULBRIGHT. Why would you be reluctant to name them? This is not a classified subject, is it?

Dr. BRENNAN. No, but you know we have Dr. Panofsky here today because of an example of what you have just said about a casual——

Senator FULBRIGHT. You are no more sure about whom that phrase refers to than the Deputy Secretary was; is that what you are saying?

Dr. BRENNAN. In at least one case I am very sure who I am referring to.

Senator FULBRIGHT. If you don't know, it is all right to say you don't know, but you say there are people. If you are sure of them, who are they, if you know?

Dr. BRENNAN. I don't have their permission to identify them publicly, sir; even in cases where I am very sure of their views this happens to be a matter where these people have not given me license to speak for them in such a public setting.

Senator CASE. I wonder if he might not inquire whether such permission can be obtained.

Senator FULBRIGHT. I don't understand this. There is nothing, as far as I know, disreputable about these subcommittee meetings. [Laughter.]

It won't embarrass them, I don't think if they actually did support it. The point is, did they do it, and who was it? If they did, I am sure they won't be embarrassed.

Dr. BRENNAN. There are some people who are——

Senator FULBRIGHT. Did you have anybody, specifically, in mind other than yourself, when you made that statement?

Dr. BRENNAN. Oh, yes.

Senator FULBRIGHT. And you are still unwilling to tell us who they were?

Dr. BRENNAN. Yes, sir.

Senator FULBRIGHT. All right.

(The following list of persons advocating some form of Sentinel was later submitted by Dr. Brennan.)

Some people believed that even a relatively light form of Sentinel might have significant capability against large Soviet attacks, not merely against Chinese or other light attacks. Such people included Herman Kahn and Max Singer of Hudson Institute. Other people believed that the original Sentinal should and perhaps would grow to a heavier system that would provide more reliable and more substantial protection against major Soviet attacks, particularly if this were coupled to a limitation on offensive forces. These included Dr. Freeman Dyson of the Institute for Advanced Study, Dr. Alvin Weinberg of the Oak Ridge National Laboratory, and Dr. Eugene Wigner of Princeton University. (Weinberg's position is elaborated in his article in the *Bulletin of the Atomic Scientists* for September 1968.) All of these people have given their permission to be thus identified in this record.

Senator FULBRIGHT. Are you the president of the Hudson Institute?

Dr. BRENNAN. Not since 1964.

Senator FULBRIGHT. Are you employed by them?

Dr. BRENNAN. Yes, sir.

HANS BETHE LETTER

Senator FULBRIGHT. Did you say that Hans Bethe approved of this system?

Dr. BRENNAN. No, sir, I said that he——

Senator FULBRIGHT. What did you say?

Dr. BRENNAN. I said he favored the use of missile defenses to protect offensive forces. I quoted from his statement to this committee on March 6.

If you would like, I will get the exact quotation from his statement which I have here.

Senator FULBRIGHT. I have it up here. We can put it in the record; there is no use bothering about it.

Dr. BRENNAN. It is on page 6 of his original statement.

Senator FULBRIGHT. Well, read it, if you have it there.

Dr. BRENNAN. Yes, he says: "A completely different concept of ABM is to deploy it around Minuteman silos and at command and control centers. This application has gone in and out of Defense Department planning. I am in favor of such a scheme."

And then he goes on to give reasons. Of course, he was not necessarily referring to the particulars of the Safeguard program which were not before him at the time he wrote that statement, and one would not necessarily construe that as Dr. Bethe's support of the Safeguard program per se.

Senator FULBRIGHT. Well, I have in my hand a letter from Dr. Bethe dated March 21, addressed to Senator Cooper, a member of the Foreign Relations Committee. I may say, by background, he did come before this subcommittee prior to the change to the Safeguard proposal. I won't read it all, but it reads in part as follows: "Dear Senator Cooper: You may be interested in my opinion on the revised ABM System as proposed by President Nixon. In my opinion it is considerably improved over the previous proposal but I am still against it."

I think the whole letter should go in the record. There is no use in reading it all. But he does give reasons, as he is a very meticulous man. He says: "As I indicated to Mr. Miller I should be glad to testify also to the Armed Services Committee if they call me as a witness."

(The letter referred to follows:)

Dr. H. A. BETHE,
Ithaca, N.Y., March 21, 1969.

Senator JOHN SHERMAN COOPER,
Senate Office Building, Washington, D.C.

DEAR SENATOR COOPER: You may be interested in my opinion on the revised ABM system as proposed by President Nixon. In my opinion it is considerably improved over the previous proposal but I am still against it.

(1) The main part of the system is still the old Sentinel, although reduced from 16 to 10 missile sites (not counting the two sites defending Minuteman). The reduction in number seems to me a good step, making it clearer that the system is not designed against Russia. It will take care of accidental launches by some potential enemy of a few missiles. However it will of course still be penetrable by the Chinese once they develop penetration aids.

I am still afraid that some time in the future we may be engaged in an arms race of our ABM against a developing increased threat from China. I am afraid that such a race will bring the Russians in, and lead to escalation on their part. The only consolation is that this may be 10 years off and we might leave this worry to the President and the Senate at that time.

(2) As I mentioned in my testimony on March 6, I consider the ABM defense of Minuteman sites technically feasible and in principle sensible. It is a reasonable safeguard against the development of MIRV.

However the deployment of ABM around Minuteman seems to me premature as I also indicated in my testimony. The Russians have only just begun to test multiple reentry vehicles. It will take a long time before they perfect this art, before they achieve the very high accuracy necessary to threaten our Minuteman, and even longer before they actually deploy these MIRVs in their missiles. In my opinion it would be better for us to have disarmament negotiations with the Russians promptly, to find out their intentions with regard to MIRV, and to attempt to prevent deployment of accurate MIRVs by an arms control agreement. However I must admit that I do not at present know any reliable way to monitor such an agreement.

Another reason for delay in deployment of ABM around Minuteman is that it may be possible to design radars which are more appropriate for this particular job than the existing MSR.

(3) The best part of President Nixon's package is his strong statement that he is not planning a thick system directed against the Soviet Union. No similar statement was made directly by former President Johnson, although former Secretary McNamara went on record in this direction. The most encouraging statement was that of the Chiefs of Staff that they have given up pressing for the thick system.

As a visible sign of the abandonment of the thick system the President has ordered the missile sites to be removed from the neighborhood of big cities. This is a very constructive move, and indicates to me that President Nixon is serious in not wishing to deploy his Safeguard system as a first step toward a thick system. Incidentally it will of course calm down many inhabitants of the big cities who were opposed to deployment of Sentinel "in their back yard".

(4) The reduction of spending in the first year from 1.8 to 0.8 billion is to be welcomed. But the total price of the system is somewhat higher than the original Sentinel. The annual review of the ABM is of course also to be welcomed. So is the plan to make technical improvements as quickly as possible to counter the present deficiencies of the system. Of course, an area defense system can never be very effective in the presence of penetration aids, because it is virtually impossible to distinguish penetration aids from warheads above the atmosphere.

It was a pleasure to testify to the Subcommittee on Disarmament on March 6. As I indicated to Mr. Miller I shall be glad to testify also to the Armed Services Committee if they call me as a witness. Thank you for suggesting my name to them.

Yours sincerely,

HANS A. BETHE.

Senator FULBRIGHT. They have never called him. Have you ever been called by the Armed Services Committee?

Dr. BRENNAN. For their forthcoming series of hearings.

Senator FULBRIGHT. You have?

Dr. BRENNAN. Yes, sir.

Senator GORE. In support of ABM?

Dr. BRENNAN. Yes.

CONSULTATION WITH THE DEPARTMENT OF DEFENSE

Senator FULBRIGHT. Did you ever consult with the Pentagon or anyone connected with the Defense Department about this matter in the past?

Dr. BRENNAN. About the subject of missile defense generally, yes, sir, on many occasions.

Senator FULBRIGHT. About the Sentinel or about the Safeguard?

Dr. BRENNAN. Not about the details of the Safeguard program. About missile defense in general terms on many occasions.

Senator FULBRIGHT. You say many occasions. Is the Hudson Institute an independent institution?

Dr. BRENNAN. Yes, sir. In the sense of the positions that we take. We do not necessarily support party lines from any sponsoring agency.

HUDSON INSTITUTE SUPPORT

Senator FULBRIGHT. How is the Hudson Institute supported?

Dr. BRENNAN. By contracts from a number of sources and by grants from a number of sources.

Senator FULBRIGHT. Are any of your contracts made with any Government agency?

Dr. BRENNAN. Oh, yes. Yes, a large fraction of them with the Department of Defense. Others have been from the Arms Control and Disarmament Agency. Some from the State Department, as I recall; certainly the Atomic Energy Commission.

Senator FULBRIGHT. What percentage of the support of the Hudson Institute is attributable to Government sources?

Dr. BRENNAN. I cannot give you an accurate number over any particular period of time, but I think if I said something like 80 percent over the past 2 years it would probably be roughly correct.

Senator FULBRIGHT. What was it when you were president? Was it about that when you were president?

Dr. BRENNAN. No, sir, it was higher.

Senator FULBRIGHT. How high was it?

Dr. BRENNAN. Probably around 90 percent.

Senator FULBRIGHT. Was the institute created by the Pentagon? How was it created?

Dr. BRENNAN. No, it was created independently. A number of people thought that it was probably appropriate to have a policy research institute of this type established that would be outside of the Government and, in certain suitable senses, independent of it.

Senator FULBRIGHT. Were you considered to be outside of the Government?

Dr. BRENNAN. Oh, yes.

Senator FULBRIGHT. Do you think you would continue to get contracts if you didn't agree with the point of view of the Joint Chiefs of Staff?

Dr. BRENNAN. Oh, yes.

Senator FULBRIGHT. You do?

Dr. BRENNAN. Yes, sir.

Senator FULBRIGHT. Have you ever disagreed with them?

Dr. BRENNAN. Yes, sir.

Senator FULBRIGHT. What is a good example?

Dr. BRENNAN. Well, for example, on the deployment of heavy defense currently. To take a particular case, I am appearing before you today suggesting the deployment of a program which the Joint Chiefs are no longer recommending, and which they probably would not favor my advocating to you at this time.

Senator FULBRIGHT. When did they quit recommending it?

Dr. BRENNAN. About 2 or 3 weeks ago, 2 weeks ago—something like that.

DEFENSIVE SYSTEM RECOMMENDED

Senator FULBRIGHT. You have in this article and in your statement, as I understand it, recommended a defensive system.

Dr. BRENNAN. Yes, sir.

Senator FULBRIGHT. Is there any precedent for a defensive system in this area of international relations that you can think of? I have difficulty in understanding what you mean by this. Do you mean to abandon your offensive weapons and have only defensive weapons?

Dr. BRENNAN. Well, "abandon" would state it——

Senator FULBRIGHT. What would you propose to do about it? Describe it in simple terms for me, please, sir.

Dr. BRENNAN. My preference, as to the direction for U.S. strategic policy, would be to see an increasing emphasis on defense as opposed to deterrence.

Now, exactly how that preference should be worked out in detail is a matter that would depend on, among other things, discussions with the Soviets, and these discussions have not yet been seriously begun.

I would say that it is probably feasible, at some relatively early point, to get something like a ceiling on offensive forces, with the understanding that the further development of defenses could be permitted. I think it possible that, subsequent to the development of at least some defenses, we might find it possible to begin to reduce the offensive forces in some direct way. Exactly how that program would go would be dependent very much on the circumstances and the further evolution of the technology.

EXPENSE OF A DEFENSE SYSTEM

Senator FULBRIGHT. You state in this same article, and I quote:

"In recent years, however, it has become apparent that cheap forms of decoys and other penetration aids cannot be relied upon to nullify modern defense techniques. A good defense can be overcome, but it is difficult. This is reflected in the fact that cost exchange ratios for a good defense are now believed to be in the region of 1 to 1—perhaps one-third, or two; but not one-tenth, or 10. Thus it is about as expensive to nullify a good defense as to build it."

I always had been under the impression, in considering this subject that the defense, that the construction of a reasonably effective Safeguard system, with its radars and other components, would be vastly more expensive than the building and delivery of a Minuteman or SS–9. Is what I am saying inconsistent with what you say?

Dr. BRENNAN. Not necessarily, if by "Safeguard" you mean the actually proposed system that has been identified by the administration in the recent past.

Senator FULBRIGHT. Well, a system on that order with its radars and missiles. What you seem to be saying is—and, I was going to say—if this is true, we could spend the Russians into bankruptcy.

Dr. BRENNAN. If you felt so inclined.

Senator FULBRIGHT. If we felt so inclined. I sometimes think this is part of the policy of the Pentagon, that we can outspend them and, therefore, they will have to, as they say down South, holler "calf rope" before we do.

Dr. BRENNAN. I was speaking of an effective defense in the sense of Senator Gore when I said it is difficult to overcome. The Sentinel and Safeguard type defenses for the purpose of city defense are what are called thin defenses, and what I was speaking about was an effective or heavier defense.

Senator FULBRIGHT. The heavier it is the more it costs, doesn't it?

Dr. BRENNAN. Yes, sir, but there is a sharp increase in performance as the cost goes up. For a $10 billion or $15 billion system it turns out to be very difficult to penetrate. For a $5 billion system it isn't so difficult to penetrate.

Senator FULBRIGHT. Why do you speak with such assurance on this when none has ever been built? Why do you think it will work this way?

Dr. BRENNAN. Because there has been a great deal of research and development of the technical possibilities and within fairly close ranges costs have been fairly closely pinned down.

RESEARCH ON MISSILE DEFENSE

Senator FULBRIGHT. Has the Hudson Institute made this research on technical aspects?

Dr. BRENNAN. No, sir.

Senator FULBRIGHT. Who has done this research?

Dr. BRENNAN. It has been done at a great many places.

Senator FULBRIGHT. Where?

Dr. BRENNAN. Bell Laboratories, the Lawrence Radiation Laboratories, Livermore, General Research Corp., Sandia Corp.—a great deal of work has been done on missile defense in a great many places.

DEFENSE-OFFENSE RATIO

Senator FULBRIGHT. Dr. Panofsky, this is a little in your line of engineering, the construction. Do you agree with this statement that the defense to offense ratio bears a relation of about 1 to 1?

Dr. PANOFSKY. No, sir, I don't agree with the statement in that way. There is a lot of confusion on the subject.

This ratio depends very much on the damage to the population which one considers to be acceptable. If you want to have a high-level defense at which casualties which would result from nuclear war would be relatively small, then this defense-offense cost ratio is very *unfavorable* to the defense.

Senator FULBRIGHT. You mean it costs a lot more to create it?

Dr. PANOFSKY. It costs a lot more to defend a population than the enemy would have to spend to defeat the defense if one wishes to hold casualty levels at low values.

Now, the higher the casualty levels are at which these calculations are being carried out, the more favorable to the defense relative to the offense these figures become.

On the other hand, I always feel that since these calculations assume casualties only by initial blast effect and ignore all other causes—fires, epidemics, and so forth—they tend to underestimate the casualties; therefore, I would conclude that it is still true that at those casualty levels where a nuclear war would not destroy the society, the cost of defense relative to the cost of offense to defeat it is very much higher.

Senator FULBRIGHT. Dr. Panofsky, I believe you were born in Berlin?

Dr. PANOFSKY. Correct.

Senator FULBRIGHT. Are you familiar with the Maginot Line?

Dr. PANOFSKY. I have heard about it, yes, sir.

Senator FULBRIGHT. Well, it was a defense, wasn't it?

Dr. PANOFSKY. Yes.

Senator FULBRIGHT. Was it more costly to build than it was for the Germans to penetrate it?

Dr. PANOFSKY. I frankly don't know the answer to that question.

Senator FULBRIGHT. I was always under the impression it was very costly and utterly ineffective. You don't believe that?

Dr. PANOFSKY. I do not have the quantitative information.

Senator FULBRIGHT. You don't have any information about it?

POINT OF A HEAVY DEFENSE

Dr. BRENNAN. May I remark, by the way, that the kind of dependence that Dr. Panofsky spoke of on the level of damage that the offense wishes to create in face of the defense, is indicated in that Foreign Affairs article that I think you have. I gave those numbers.

Senator FULBRIGHT. Well, I would have assumed, yes, that you were interested in protecting the population in a thick system to a very high degree. You didn't wish to sacrifice more than the minimum, as I remember it, isn't that right?

Dr. BRENNAN. Well, it isn't something one can express with sort of a one-point answer.

Senator FULBRIGHT. Well, express it any way you like.

Dr. BRENNAN. Well, the point of a fairly heavy defense is that it will very likely reduce fatalities enormously in the event of kinds of wars that one fears might happen in the mid-70s. If the Soviets were to react to it they would have to react with very large expenditures in order to nullify wholly the values of defense, and I was careful to point out in the paper that the cost-exchange ratios of 1-to-1 obtain for something like complete nullification of defense. If they spend only one-fourth as much of the defense you may still be saving on the order of 60 million American lives, although it will not be doing as much for you as it would have if they hadn't done anything at all, and some of us would think 60 million American lives may be important.

Senator CASE. At that point I think we ought to register the fact that Dr. Panofsky disagrees with that statement.

Dr. BRENNAN. I did not hear him disagree.

Dr. PANOFSKY. I did not disagree with his statement.

Senator CASE. He shook his head.

COST RATIO

Dr. PANOFSKY. I was talking to the question of the cost ratio; namely, if we deployed a defense and the Soviet Union chose to nullify the defense as to how much more or less they would have to spend than we spend, if it is assumed that the Soviets wished to maintain the threat against our population at the same level. Nobody denies that putting in a defense would save American lives if the Soviets did not choose to react to it. If the Soviets do react to it, in that case you get into these "exchange" discussions and you also reach the conclusion that, should the defense fail or be less effective than it is advertised to be, then as a result of the escalation of the Soviet force produced by the American defense you are then in a war at a very much higher megaton level and greatly increased casualties would result. Therefore, a defense introduces an action-reaction problem; i.e., it feeds the arms race.

I believe that nobody actually disagrees with the statement that a defense would save American lives if two assumptions are correct; namely, the Soviets would *not* react to it and war would break out.

Dr. RATHJENS. I would like to say something.

DR. RATHJENS' CONNECTION WITH THE PENTAGON

Senator FULBRIGHT. Mr. Rathjens, before you do, it was suggested, which of course is proper, since I asked Dr. Brennan about the support of the Hudson Institute, that I ask the same of Dr. Rathjens and Dr. Panofsky, in order that I not be discriminatory.

To what degree are you employed by the Pentagon or related to the Pentagon? Are you at MIT?

Dr. RATHJENS. I am presently at MIT. I have done a little bit of consulting during the last few months that relates to the Defense Department, and to their studies.

Senator FULBRIGHT. On this subject?

Dr. RATHJENS. On a very closely related subject. A subject relating to the design and way in which we would use our strategic forces.

Senator FULBRIGHT. Is MIT primarily supported by the Government or by the Defense Department?

Dr. RATHJENS. Well, MIT and some of its laboratories derive a very large fraction of their support from the Defense Department.

Senator FULBRIGHT. To do specific research for the Defense Department?

Dr. RATHJENS. Yes, indeed.

Senator FULBRIGHT. You see, this presents a very serious question. It is almost impossible to find anybody in the United States that isn't in some way or another supported by the Defense Department and that is why I have been and many of us have been concerned about the capacity for completely objective views on a matter of this or any other kind.

STANFORD UNIVERSITY SUPPORT

Mr. Panofsky, what about you, are you at Stanford?

Dr. PANOFSKY. I am at Stanford University.

Senator FULBRIGHT. Is Stanford supported by the Pentagon, too?

Dr. PANOFSKY. Stanford research work is primarily Government supported but its educational program generally is not. Of its research work I would say about half is supported by the Health, Education, and Welfare Department in the life science area. A very large part of the physical sciences is supported by the Atomic Energy Commission because as it happens we have at Stanford a very large laboratory in high energy physics. For this field the Atomic Energy Commission is the primary government agency responsible. I would suspect that, but I can verify these figures and put them in the record, that 10 or 15 percent of Stanford financial support is from DOD.

Senator FULBRIGHT. DOD?

Dr. PANOFSKY. DOD. 10 or 15. It would be my guess.

Senator FULBRIGHT. Of the total or that which comes from the Government?

Dr. PANOFSKY. I would say of the total and probably 20 percent of that which comes from the Government.

Senator FULBRIGHT. It is still substantial.

Dr. PANOFSKY. It is substantial.

Senator FULBRIGHT. Yes, Dr. Brennan.

Dr. BRENNAN. I should like to include a few comments on this point, if I may, Senator, especially inasmuch as you started asking this question of me, I would like to try to put a little perspective on this questioning.

Senator FULBRIGHT. I wish you would. I need some.

Dr. BRENNAN. I think a useful way to do it would be to indicate not our relationships with the Joint Chiefs with which Hudson Institute has had no relationships at all, but with some of the other agencies for which we have done contract research. I can find some examples out of my experience; I will not try to speak for other parts of Hudson Institute. But let me choose as a fair example the first contract report I submitted to any Government agency relating to ballistic missile defenses. It was a report of a study which we did for the U.S. Arms Control and Disarmanent Agency and not for the Department of Defense, and that report, which was on the arms-control implications of future military technology, included a chapter which I prepared myself that suggested that there were possibly beneficial results from active defenses that the Arms Control Agency might wish to consider in a positive way.

Let me tell you that that section of that report was about as warmly received by the Arms Control and Disarmanent Agency in the summer of 1964 as a skunk at a lawn party. They were not interested in hearing a recommendation of that form, to put it very mildly.

It was one of the very frequent occasions in which we have said something to a contract sponsor that was against the prevailing biases of that contract sponsor, yet we nevertheless said it.

Senator FULBRIGHT. Has that ever happened at the Pentagon?

Dr. BRENNAN. Yes, sir, I was going to give you two Pentagon examples right now, not having to do with contract research but the published recommendations by some of the principal researchers and in this case myself.

In June of 1967, I published an article in the Bulletin of the Atomic Scientists magazine, I imagine you know of it——

Senator FULBRIGHT. Yes.

Dr. BRENNAN. In which I was highly critical of the handling of the missile defense issue by then Secretary of Defense, Mr. Robert McNamara, and in November of 1967, in that same year, while Mr. Robert S. McNamara was still Secretary of Defense, subsequent to his announcement of the original Sentinel program, I published a rather lengthy analysis of missile defenses in a paper published by the Institute for Strategic Studies in London, what they call one of their Adelphi papers, in which I was highly critical of Mr. McNamara's handling of missile defense—of the subject in general and his handling of the Sentinel deployment decision in particular. And during this entire time the bulk of the contract support that was coming for my own particular work was not from any of the military services but was from the Office of the Secretary of Defense.

Senator FULBRIGHT. Well, I think we have cleared that up.

I may say that it looks as if there is a high degree of socialism fostered by the Pentagon around this country. The whole Government is in on this act. There is hardly any private enterprise left, is there, especially in this field of research?

Dr. BRENNAN. As long as we retain our independence, does it matter?
Senator FULBRIGHT. Well, that is a matter of degree, I suppose.
Dr. Rathjens.

EFFECTIVENESS OF DEFENSE

Dr. RATHJENS. Senator, I did want to comment, and to disagree with both of my colleagues on the question of the effectiveness of a defense. To take the easy point first, Dr. Panofsky said he thought we would all agree if we had a defense and war would occur and the Soviet Union were not to react by improving its offense, the defense would save some lives. I think it probably would but I think there is a very good chance that it would not. In my view there is a very good chance that it would fail catastrophically and would save no lives at all. That is the easy one to get out of the way.

COST-EXCHANGE RATIO

The other point has to do with this question of relative cost of improving the defense and the offense, the so-called cost-exchange ratio.

I think these numbers that are commonly quoted often refer to some testimony or to the annual posture statement of several years ago that was prepared in the Defense Department and in which it was stated that the cost-exchange ratio might be close to 1, that is defense and offense could just about balance each other if they sepnt equal amounts of money.

I would like to read a half a sentence, if you like, taken from testimony by former Deputy Secretary Vance in that connection and it refers to those figures. It says those figures were and, this is a quote, in relation to the assumptions, "purposely chosen to make the strongest possible argument for the deployment of ABM so as to be absolutely fair to those who have urged such deployment." Now, that is the quote.

Let me go on, I happen to know, I think, something about the way in which those figures were generated.

For the most part, they have always been generated on the assumption that the defense would work as expected, and that the offense would use the very most conservative possible techniques for penetrating the defense. If you make those extreme assumptions, then you can produce those kinds of figures.

On the other hand, if you make alternative assumptions, for example, that the defense may not work nearly as well or that the offense may use very much less conservative penetration techniques, you come up with very different answers indeed. You come up with answers very much like the ones that we commonly thought of perhaps a decade ago where it looked like a billion dollars put into defense could be offset by perhaps a hundred-million-dollar improvement in the offense.

I just want to stress the fact that the assumptions that were made to derive the kind of figures that Dr. Brennan has cited, I believe, were made for a very special case where one is considering what we call an offense conservative calculation.

Senator FULBRIGHT. Dr. Brennan wishes to comment on it.

Dr. BRENNAN. Yes, sir. Two points.

One, the quotation of Secretary Vance is accurate of what Secretary Vance said, but what Secretary Vance himself said was extemporaneously said in hearings, and is itself incorrect. I happen to be fairly intimate with the evolution of these estimates, and it is not correct that they were chosen to give the best possible face to the missile defense. It is simply wrong.

The other point I wanted to make had to do with Dr. Rathjens' remarks on the question of whether it is offense—conservative penetration is assumed or not. It is correct that the cost-exchange ratios that I have been quoting were based on high-confidence penetration tactics, which are more expensive. It is possible that one may try to use less expensive penetration means but then they rapidly become unreliable. This is why I emphasized in the Foreign Affairs article that you quoted before that reliable penetration of a good defense is expensive.

EXPECTED PERFORMANCE OF DEFENSE

Now, another point of Dr. Rathjens that I wish to respond to is that it isn't necessarily assumed in these calculations that the defense works perfectly. He said correctly that it is assumed that the defense works as expected, but the expected performance of that defense is not, as many critics have said, intended to be perfect. It is expected that some occasional weapons would leak through the defense, and the results are calculated on that basis.

Now, it may be correct that the defense will not perform even as expected in that sense, but it is also possible, and I should like especially to stress as a further thought to what Dr. Rathjens said, that the offense may fail to perform as expected against that defense, because in general it will not have had the opportunity to test its warheads against our defenses, and he may find that his penetration is very considerably less than what was allowed for in our own calculations. Thus, the outcome, while it may be worse than the expected outcome, may also be very much better.

Senator FULBRIGHT. You are nodding your head. Does that mean you wish recognition?

Dr. PANOFSKY. Let me make two remarks. First, since we are concerned here with the question whether defense escalates the arms race, this last remark of Dr. Brennan's to some extent is irrelevant; if the offense feels that his penetration is endangered by the defense he will feel the necessity of increasing his weaponry and therefore the question whether the defenses, in fact, may not malfunction when actually used if actually used, is to some extent irrelevant, the defense system clearly does fuel the arms race.

The second remark is this: From this discussion you can see that these calculations are complex because you can make many different assumptions. I would like to emphasize that nobody, I believe, disagrees with the statement that as you go to a level of protection where really a large fraction of the population is protected, that in that case these calculations always go in the direction that defense costs a great deal more than the offense increase required to penetrate. This trend of these calculations is uncontroversial.

DOUBTS ABOUT COMPUTERS' EFFECTIVENESS

Senator FULBRIGHT. The other day when we heard Dr. York and Dr. Kistiakowsky I don't think I am wrong in saying that they both had very serious doubts about the perfection of this system, doubts as to whether it would work as alleged or expected, whatever the proper word is. When I read nearly every day or so of some strange aberration of our computers, I, without knowing anything about it, have grave doubts that this system will work any better than the computers which have been under development by IBM for years and cost a million or $5 million each. They don't work. They chew up checks. They give people wrong checks and do all sorts of strange things. Why do you think they are going to be perfect if they control a Sprint, Dr. Brennan? Will they? Does this give it some special sanctification?

Dr. BRENNAN. It isn't the Sprint that gives them the special sanctification, it is the amount of money spent on it.

Senator FULBRIGHT. These computers cost a lot of money.

Dr. BRENNAN. Not by the standards of the data processing that one puts in systems that you wish really to be reliable. For example, in the development of computers for the weapon systems like Minuteman which already have relatively complex computers in them, a great deal of attention has been devoted to making sure that the system will be reliable, and they are made on a completely different basis than the kind of commercial systems in which some failures are tolerable. One tries to make at least some of these systems so they do not fail because of simple failures of electronics and to a large extent it is in fact possible, but they, of course, become more expensive because of it.

May I go back to something Dr. Panofsky said, something in his statement, while we are still on the record, because I don't wish to go without commenting on this question of technical requirements for protection of offensive forces?

Senator FULBRIGHT. Yes, go ahead.

Dr. BRENNAN. I should say something, by the way, about what was said of Dr. Panofsky in the introduction. Senator Gore said of him he was a high-energy-particle physicist, correctly, and I guess he said that of himself. Some of us know of Dr. Panofsky as a high-energy particle.

I don't think he was ever sent down in his accelerator tube at the Stanford accelerator but still he is thought of as a high-energy particle and I hope in the present setting our collision cross section won't be too large.

PROTECTION OF BOMBER BASES

I disagree with him essentially on three points in connection with his technical remarks. First, on the protection of bomber bases. He thought it was not a separate requirement to have protection of bomber bases, if I understood it rightly, because of the threat of retaliating with the entire Minuteman force in the event that the bomber bases themselves are attacked. Was that basically it?

Dr. PANOFSKY. And Polaris and tactical air, et cetera.

Dr. BRENNAN. Right, the remaining parts of the strategic force. That in essence is protecting a major component of the strategic forces

by sheer deterrence, and I happen, in general, to be against that. I think it is a bad idea, and I think it would be a bad idea in this particular case here when a technical defense of the system is in fact possible. We could try to protect large parts of our deterrent force by sheer deterrence if you were willing to engage in tactics like launch on warning, which I understand has been under discussion before this subcommittee, and I think many people, including, I suspect, in come contexts, Dr. Panofsky, would be nervous about protecting any large components of the strategic force by sheer deterrence. It does seem feasible to have active defense of the bomber forces and for a variety of reasons, including this one, I think it is desirable.

DIFFICULTY OF SYNCHRONIZED ATTACK

Second, on the difficulty of synchronized attack, I agree in essence with everything he said in his statement that synchronized attacks on a number of different components of our strategic forces are hard to pull off.

It is very difficult to pull off a tightly synchronized attack on many different components of a force in such a way that you can destroy a large fraction of the force perhaps down to——

Senator FULBRIGHT. Without having ABM you mean?

Dr. BRENNAN. Well, with or without it, it is hard.

Senator FULBRIGHT. With or without it, all right, with or without it.

Dr. BRENNAN. In particular without it, as he was saying, you have a lot of protection of the force from its diversity because it is hard to attack them all at the same time in a suitable way.

It is indeed difficult, but not necessarily more difficult than the kind of attack that we have already experienced at Pearl Harbor.

If one looks at the kind of planning detail that was necessary to go into that Pearl Harbor attack, the preparations that were necessary, the length of time the task force had to be underway before it struck, the likelihood of pulling off an attack of that sort successfully would have appeared in advance very low, yet it can happen.

Now, I don't wish to sound like a worrywart here and suggest that we have to worry about every possible horror scenario that anyone can invent, but I do wish to suggest that just because something may be complicated doesn't mean we don't wish to take it with some degree of seriousness, and I think Dr. Panofsky on that level may agree.

DOES ABM PREVENT A NUCLEAR WAR?

Senator FULBRIGHT. I think maybe I am ready to yield here. I want to say this: I think I have been guilty of allowing this discussion to go into an area I didn't really wish to emphasize. I think what the committee is mostly interested in is not having a war. We are not so interested in what happens after you are into it, but whether or not these moves of creating an ABM or not creating it or something else is calculated to really, at least, contribute to the prevention of war. Once you have a war, there is very little you can do. If you have a nuclear exchange everybody seems to agree there is not going to be very much left.

Dr. BRENNAN. But the main important reason——

Senator FULBRIGHT. The real deterrence or prevention of the war is the main question that we were seeking to explore. None of us is a

scientist or qualified to get into the very fine details of whether 60 million or 62 million or 50 million people are killed. It isn't the primary purpose of our inquiry.

Senator Pell, do you have some questions?

Senator PELL. I have a couple of questions.

HEAVIER DEFENSE SYSTEM URGED

I want to be sure I heard you correctly, Dr. Brennan. Did you say the Joint Chiefs of Staff did not agree with the position you take in supporting Safeguard?

Dr. BRENNAN. No, sir.

Senator PELL. What was the sentence you said?

Dr. BRENNAN. I did not say that. I said they do not share the position that I have of advocating a heavier defense than the program in Safeguard.

Senator PELL. Right. Along the same line, when you criticized Secretary McNamara some time back in connection with antiballistic missile systems, were you criticizing him then on the ground that he did not go far enough or that he went too far?

Dr. BRENNAN. Well, certainly more the former than the latter, but on more detailed grounds. Some of the specific issues that came up and the way he addressed them.

Senator PELL. So you have always been consistent in your view that there should be a heavy defense system?

Dr. BRENNAN. Consistent since 1964.

Senator PELL. Right.

Dr. BRENNAN. I remarked in my statement that I changed my position in 1964.

DISARMING NUCLEAR WEAPONS

Senator PELL. Now, it was indicated the other day by Secretary Laird that we could disarm our nuclear weapons when they were in flight. That is a correct statement; is it not?

Dr. BRENNAN. On a matter of that kind I should be reluctant to comment on the Secretary of Defense.

Senator PELL. Anyway he said that it was possible.

RELATIVE TECHNOLOGICAL CAPABILITY OF U.S. AND U.S.S.R.

Now, would you imagine that the technological capability of the Soviets is about the same as ours in the missile field? Are we ahead of them or are they ahead of us?

Dr. BRENNAN. The information I have, which is, of course, incomplete, would suggest that in certain important areas we are probably ahead. In the development of high-yield warheads as a particular area, the Soviets may possibly be ahead. They may possibly be ahead in some areas of technology not so visible to us or at least not so visible to me. I think we are probably ahead in electronic and booster technology and perhaps in protection technology.

Senator PELL. Presuming that the Secretary's statement was that we can disarm missiles in flight, would you be of the opinion that the Soviets probably have the same ability to disarm their missiles in flight?

Dr. BRENNAN. No, sir.

Senator PELL. You would not. You would think we might be ahead of them in this particular capacity?

Dr. BRENNAN. I should say that whether it would be desirable to have a system of that kind or not would be a very controversial judgment, and I can easily imagine the Soviets might make the judgment that even though they might be able to do it technically they would prefer not to install such a capability.

Senator PELL. Why?

Dr. BRENNAN. Because there are at most very few minutes during which you could change your mind during the launch of a missile and after that it is well on the way and you could not do anything about disarming it anyway. You might have 5 or 10 minutes between the time you launch it and the time it gets out of reach of your disabling mechanism during which you might be able to disarm it. That is not very much time to change your mind, and you pay for that ability by making it vulnerable to the enemy to find the mechanism by which you disarm the warhead.

DISARMING OF AN ENEMY'S WEAPONS

Senator PELL. In other words, it might be conceivable that if we have the ability to disarm our weapons in flight, the Soviets could disarm our weapons in flight, too?

Dr. BRENNAN. If indeed that capability is built into the weapons; yes.

Senator PELL. The Secretary of Defense indicated weapons could be disarmed in flight. So for that reason, a horrible thought occurs to me, that it might be conceivable that their missiles could disarm our weapons in flight.

Dr. BRENNAN. If there is such a capability this would be a risk. That is one of the reasons why there may not be such a capability.

Senator PELL. On the Soviet side?

Dr. BRENNAN. And conceivably the Secretary may have been carelessly phrasing something or it may have been that he was misunderstood.

Senator PELL. At this point I would ask the staff to put in the record the quotation of the Secretary of Defense in this regard. That was my recollection, but my recollection is often faulty.

(The excerpt from Secretary Laird's testimony on March 21, referred to, follows:)

Senator SYMINGTON. All I am saying is that, under modern technology you have the same amount of control as to launch on the missile sites as you did in the past.

Secretary LAIRD. But we do not have the time factor.

Senator SYMINGTON. That is right. It is down to minutes however, instead of hours.

Secretary LAIRD. And we are down to a very few minutes. I think that should be understood by all of us.

Senator SYMINGTON. Thank you, Mr. Chairman.

Secretary LAIRD. You cannot bring our missile force back and refuel it. You can bring——

Senator SYMINGTON. But at least you would have it unarmed, ending up without a nuclear explosion.

Secretary LAIRD. You can have it land without a nuclear explosion, I know that, but it is a question of minutes, not hours. [Subsequently, the Defense Department amended this answer to read as follows: "No. Once the Minuteman is launched no control over the arming process is possible."]

Dr. BRENNAN. I may be contradicted. It would be a very difficult decision to install such a capability and if such a decision has been made it must have been after considerable thought.

Senator PELL. All I can say is, I hope we both develop this capability and are able to disarm the warheads of the other side.

(Dr. Brennan asked that the following statement on disarming weapons in flight be inserted at this point in the record:)

Neither the Polaris nor the Minuteman missiles, to which I believe Senator Pell was referring, are provided with a capability for deliberately disarming the weapons after launch. This fact was confirmed by Dr. John S. Foster, Jr., Director of Defense Research and Engineering, who suggested that some confusion over this point may have arisen in earlier sessions because defensive interceptor weapons—such as Sprint and Spartan—would be kept under control after launch in such a way that they could detonate with nuclear yield only by specific command from the ground when they were near their intended targets. In particular, such interceptors would be automatically disarmed if the ground control were turned off or otherwise lost for an appreciable period of time.

EXTENT OF NUCLEAR DEVASTATION

Senator Pell. In connection with the impact, but I would be interested in Dr. Brennan's view, as to what would be the effect on the northern hemisphere of a nuclear exchange. Would the northern hemisphere be habitable after such an exchange?

Dr. BRENNAN. Oh, yes. Yes, with foreseeable force levels United States-Soviet general wars might enable attacks on the order of, say 3,000 to 5,000 megatons through the 1970s, and with 3,000 to 5,000 megatons, you would have relatively rapid recovery as a potential capability, at least the radiation itself would not preclude it. How rapidly and how effectively and how completely, of course, would depend on preparations, if any; absent any preparations you would lose a great many people from an attack at that level, but the survivors would be able to go on sooner or later.

Senator PELL. You would not share the views of some of your colleagues that it would render the northern hemisphere uninhabitable for homo sapiens?

Dr. BRENNAN. There are none of my colleagues known to me who believe that attacks of that level would render the northern hemisphere uninhabitable. It takes something on the order of perhaps 100,000 megatons or more of fission yield to make the northern hemisphere uninhabitable. It would require very large attacks relative to foreseeable forces.

Senator PELL. Right.

Dr. BRENNAN. I am not suggesting that the foreseeable forces are something that one views with equanimity.

DEFENSE DEPARTMENT SUPPORT OF INSTITUTIONS

Senator PELL. Thank you. Another query here, returning to this question of the support the Defense Department would contribute and the 80 percent of the Government support that the Hudson Institute receives, did you mention what portion of that is from defense contracts?

Dr. BRENNAN. No, sir; I did not. What portion——

Senator PELL. What would that proportion be?

Dr. BRENNAN. The proportion would be perhaps three-quarters.

Senator PELL. And also for MIT, of the Government support, what portion would come from Defense?

Dr. RATHJENS. Well, Senator, I really don't know. I am not in the MIT administration and I would prefer not to comment on it. I just don't know.

Dr. BRENNAN. I may be able to estimate that actually because I had a long association with MIT and I still read their reports, and I think it is probable that the degree of Defense Department support in the total Government support would be over 60 percent.

Senator PELL. At MIT?

Dr. BRENNAN. At MIT. In at least the major laboratories. I should qualify that one degree further. Something over half, substantially over half of the total MIT budget, if you view it as one organization, derives from two major laboratories, the Lincoln Laboratory and the Instrumentation Laboratory, and the greater part of their support comes from the Government. The Instrumentation Laboratory has historically had the bulk of its support come from the Department of Defense, but in recent years they have had quite a lot of support from the National Astronautics and Space Administration, so that the NASA support for the Instrumentation Laboratory because of the Apollo programs would now be quite substantial. I would guess of those two laboratories probably something like three-quarters or 80 percent of their support in the past few years has come from the Defense Department.

Senator PELL. Right. Let's presume that is correct but also ask Dr. Rathjens to make any necessary correction in that statement later for the record.

Dr. RATHJENS. I would be pleased to. I don't want to in any way be cast here in the role of representing MIT.

Senator PELL. No, I understand because I am interested in it myself. I had not realized the point that the Chairman brought out so well; namely, the financial dependence of so many of our educational institutions on Government-sponsored research projects.

Dr. RATHJENS. I will undertake to do that but I want to emphasize the views I have expressed are entirely my own.

Senator PELL. That is right.

(The information referred to follows:)

M.I.T.'S EXPENDITURES FOR ON-CAMPUS SPONSORED RESEARCH

M.I.T.'s expenditures for on-campus sponsored research totaled $55,800,000 during fiscal 1967–1968. Of this amount, $5,900,000 in research support was provided by industry, foundations and such sources as state and local governments, while the remaining $49,900,000 came from Federal agencies. Regardless of the source, however, the research was conducted in the academic departments and interdepartmental laboratories as an integral part of the graduate education program in the same manner as research supported by the Institute's own funds.

Of the Federal total, $9,800,000 of research, primarily in basic physics and nuclear engineering, was supported by the AEC, and $6,200,000 of research in the space sciences was funded by NASA. The National Science Foundation granted $7,100,000 to support a broad spectrum of basic research programs, while the National Institutes of Health contributed $7,400,000 chiefly for research in the health related sciences and in biomedical engineering. An additional $2,100,000 was provided by other HEW activities and by such Departments as Transportation, Housing and Urban Development, Commerce, State and Interior.

The remaining Federal support of $17,300,000 was provided by the Department of Defense. Of this, $5,900,000 in research was funded by the Air Force, with the largest share supporting the National Magnet Laboratory, a unique facility open to researchers from all over the world for basic investigations. The Army provided $2,300,000 primarily to support, on behalf of the three services, fundamental studies in the Research Laboratory of Electronics, and the Navy funded $7,100,000 in research expenditures, the largest share going to Project MAC, a computer research project considered by many to be the world's most advanced in the development of time sharing and other computer techniques.

The Advanced Research Projects Agency provided $1,900,000 to the Center for Materials Science and Engineering to support a broad program involving basic research in materials, ranging from metals to ceramics, and the development of new materials.

It might be noted that nearly a quarter of all research done on the M.I.T. campus is health related, amounting in the 1967–1968 fiscal year to $12,300,000. There were some 225 health-related projects involving some 1,100 persons, including 327 academic staff and 529 graduate students. Most health-related research is done in the departments of Biology, Psychology, and Nutrition and Food Sciences, and food and nutrition research alone was more than $3,000,000. However, during the same period, at least $3,500,000 was devoted to bioscience and bioengineering programs in the Departments of Electrical, Chemical and Mechanical Engineering; Metallurgy, Chemistry and Physics; and in the Research Laboratory of Electronics and the Center for Space Research.

Another activity that has grown rapidly at M.I.T. in recent years is research related to urban problems, which may be one of the most significant developments in the history of the Institute. There are at least 93 active projects, ranging from studies in new methods of transportation to trash disposal. Many of these projects are associated with the Urban Systems Laboratory, recently organized within the academic structure to develop means of applying systems analysis, operations research and computer methods to complex urban problems.

In addition to its academic research on-campus, M.I.T. operates two large "Special Laboratories"—the Instrumentation Laboratory in Cambridge, and the Lincoln Laboratory in Lexington, both wholly supported by Federal funds. Although administratively and financially integrated with overall Institute operations, the technical management and direction are handled in a manner similar in many respects to the Los Alamos and Livermore Laboratories managed by the University of California for the AEC, the Jet Propulsion Laboratory managed by the California Institute of Technology for NASA, and the Argonne National Laboratory, administered by the University of Chicago for the AEC. Work at the M.I.T. "Special Laboratories" is performed under cost-type contracts without fee or profit, the same basis on which sponsored research on-campus is conducted.

The Instrumentation Laboratory is devoted primarily to research and development relating to inertial guidance systems, which make it possible to guide a vehicle with remarkable precision without magnetic compass or ground control. Under contract with NASA, the Laboratory has developed the guidance and navigation systems of Apollo vehicles, which involved 1967–1968 expenditures of some $20,000,000. During the same period, approximately $30,000,000 was expended in connection with DOD programs, including development of a guidance system for the Navy's Deep Submergence Rescue Vehicle, and the development of the guidance systems for the Thor, Polaris and Poseidon missiles, programs undertaken by the Instrumentation Laboratory at the invitation of the sponsoring agencies as a result of the Laboratory's unique competence in this area.

The Laboratory has also engaged in extensive research for the Federal Aviation Authority on an inertial reference system for the solution of perplexing air traffic problems, and as a result of a feasibility study funded by the Public Health Service, has proposed the development and construction of a scanning microscope coupled with a digital computer to perform analyses in connection with air pollution. Laboratory expenditures during fiscal 1967–1968 totaled $54,000,000.

Turning to the Lincoln Laboratory, its role is best understood if one recalls that at the approach of World War II, M.I.T. was the leading center for research in what later came to be known as electronics. For this reason, it was assigned responsibility for the development of radar, and the Radiation Laboratory was established for this purpose. That Laboratory was disbanded at the end of the war, but many of its key researchers remained at M.I.T. and the Research Laboratory of Electronics was organized to continue basic research.

As cold war tensions increased, M.I.T. was asked to assume responsibility for the development of a continental air defense system. Lincoln Laboratory was established and developed the SAGE (Semi-Automatic Ground Environment) System and later BMEWS (Ballistic Missile Early Warning System). Both of these systems required the application of extremely sophisticated technology, especially in the fields of radar, communications and data processing. The Laboratory has not only continued its work in these areas, but has also made significant contributions to solid state and other fundamental research. For ARPA it has undertaken the Vela Uniform program, a study in the detection, location and identification of underground nuclear explosions through a complex seismic system in Montana, and its work in radio physics and astronomy has led to important

scientific achievements including radar observations of Mercury, Mars and Venus, and a test of Einstein's general theory of relativity. The Laboratory's 1967–1968 expenditures totaled $65,000,000, of which $64,000,000 was funded by the Department of Defense. Although much of the research performed at Lincoln Laboratory is classified, information concerning virtually all of it has been published in the technical and lay press and is available to the public.

Both of the "Special Laboratories" have in recent years undertaken not only an increasing amount of baisc research, but have initiated a number of programs oriented to social problems and national goals in such areas as pollution, transportation, and bioengineering.

Senator PELL. Dr. Panofsky, I realize the views you have expressed are your own, not necessarily those of your university, but would you be kind enough to give us an estimate of the situation at Stanford?

Dr. PANOFSKY. Can I submit it for the record?

Senator PELL. I know you covered some of it earlier.

Dr. PANOFSKY. I gave already an approximate estimate.

Senator PELL. That is right.

Dr. PANOFSKY. I pointed out that at Stanford a very much larger percentage of the Government support of research derives through the Department of Health, Education, and Welfare through its National Institutes of Health because of the very large component of health-related research at Stanford. The Stanford Accelerator Center which is a national facility which serves a large community, is supported by the AEC. Therefore you will find in our case that although almost all research is Government supported, a fraction of that which is supported by the Defense Department is relatively small. I gave you the approximate estimate before but I will be happy to submit for the record the detailed numbers.

Senator PELL. I thank you very much.

Thank you, Mr. Chairman.

(The information referred to follows:)

STANFORD UNIVERSITY—EXPENDITURES AND INCOME USED SUMMARY

	Years ended Aug. 31—	
	1967	1968
Expenditures:		
Instruction	$30,693,048	$32,218,779
Research	37,805,993	39,397,513
Libraries and institutes	5,290,163	6,341,894
Student aid	6,659,399	7,969,893
Student services	3,253,418	3,536,407
Plant operation and maintenance	4,147,084	4,614,681
Administration	4,825,641	5,231,175
General expense	1,467,324	1,574,592
Auxiliary activities	13,121,134	14,405,957
Total operating expenditures	107,263,204	115,290,891
Stanford Linear Accelerator Center research	23,146,501	25,658,008
Total expenditures	130,409,705	140,948,899
Income used:		
Tuition and student fees	18,124,931	20,613,237
Other income and fees	4,196,840	3,898,408
Investment income	8,613,812	9,813,926
Expendable gifts and grants	10,784,815	11,054,431
Sponsored projects—contracts	[1] 23,883,602	[1] 24,203,609
Sponsored projects—grants	[1] 29,708,046	[1] 32,900,573
Auxiliary activities	13,121,134	14,405,957
Unrestricted income allocated	(1,169,976)	(1,599,250)
Total operating income	107,263,204	115,290,891
SLAC-Government sponsored	[1] 23,146,501	[1] 25,658,008
Total income used	130,409,705	140,948,899
Plant expenditures are excluded, except for equipment purchases by departments of	4,380,318	4,164,330

[1] Government supported.

INCOME USED, YEAR ENDING AUG. 31, 1968

	Amount (in millions)	Percent of total income used
1. Government:		
AEC:		
SLAC	$25.6	
Non-SLAC	1.2	
AEC total	26.8	19
DOD	17.1	12
NASA	4.3	3
National Science Foundation	8.0	6
Office of Education	3.2	2
U.S. Public Health Service	16.6	12
Other Government	6.8	5
Total Government	82.8	59
2. Total non-Government	58.1	41
3. Total	140.9	100

TRIBUTE TO PRESIDENT EISENHOWER

Senator FULBRIGHT. Gentlemen, I have just been informed by the press that President Eisenhower died a few minutes ago. I wouldn't want to conclude the meeting without saying just a word or two. I know I speak for this committee as well as the Senate in expressing our sadness and regret and our sympathy for his family.

It is appropriate to say this, and especially with respect to this meeting: As we all know, President Eisenhower, stopped the war in Korea for which we all honor him. And his administration was a period of relative tranquillity in our country for which we also honor him. His statements in his farewell address warned our country of the danger arising from the undue growth and proliferation of the military-industrial complex. Time has confirmed his judgment in a most dramatic way, and again I think we honor him. I hope that we take his advice more seriously in the future.

Gentlemen, the subcommittee is adjourned. The subcommittee will recess until after Easter when it will consider possibly scheduling further hearings.

Thank you very much, gentlemen. We appreciate your coming.

(Whereupon, at 1:10 p.m. the subcommittee adjourned.)

APPENDIX

STATEMENTS SUBMITTED FOR THE RECORD

THE AMERICAN LEGION,
Washington, D.C., February 28, 1969.

Hon. ALBERT GORE,
Chairman, Subcommittee on Disarmament, Senate Committee on Foreign Relations, Washington, D.C.

DEAR SENATOR GORE: At our 50th National Convention held in New Orleans last September, The American Legion unanimously adopted Resolution No. 307 supporting the development and deployment of an antiballistic missile system.

We understand that your Subcommittee on Disarmament will hold hearings on this subject next week.

For the information of you and the members of your Subcommittee, I am enclosing herewith a copy of Resolution 307 and will appreciate your making it a part of the record of your hearings.

Sincerely yours,

HERALD E. STRINGER, *Director.*

50TH NATIONAL CONVENTION OF THE AMERICAN LEGION HELD IN NEW ORLEANS LA., SEPTEMBER 10–12, 1968

RESOLUTION NO. 307

Whereas, The American Legion has called upon Congress and the Executive Department of the Federal Government to assign a high priority for the development and deployment of an anti-ballistic missile system, which would give the United States a strong deterrent toward any aggressive nation, and hence, enthusiastically applauds our government's recent decision to employ a thin anti-ballistic missile system known as Sentinel, capable of giving limited protection against the nuclear threat of communist countries; and

Whereas, The American Legion is convinced that the communist goal is not military parity, but superiority; and

Whereas, Russia is at present deploying new weapons, such as the Fractional Orbiting Bomb (FOB), Multiple Independent Re-entry Vehicles (MIRV), improved Anti-Ballistic Missile Systems (ABM), and is increasing also its land and sea forces of Intercontinental Ballistic Missiles (ICBM); and

Whereas, these alarming changes in the over-all strategic power between the United States, and the Soviet Union, could cause a serious imbalance within the defense capabilities of the free world and those of the forces of communism, making it mandatory that our present Sentinel system be improved and expanded: Now, therefore, be it

Resolved, by The American Legion in National Convention assembled in New Orleans, Louisiana, September 10, 11, 12, 1968, That they recognize that a broad margin of superiority must be maintained by the free world until peace is assured and urges the President, and Congress to take action in expediting the authorization of the necessary funds for the continued advance research, development and ultimate deployment of an improved and expanded Anti-Ballistic Missile System.

COLUMBIA UNIVERSITY IN THE CITY OF NEW YORK,
New York, N.Y., March 10, 1969.

The strategic value of anti-ballistic missiles is at least as questionable as their technological feasibility and the justification for the multi-billion dollar cost involved. Super-power strategy is based on a "balance of terror" according to which the United States and the Soviet Union hold each other in abeyance by threatening each other with nuclear annihilation.

Assuming the ABMs *would* provide an effective shield against a massive nuclear attack, this would have the following strategic consequences:

If both the U.S. and the U.S.S.R. implement the system more or less at the same time and at similar levels of efficacy, we will be back at the present stalemate having spent many billions of dollars.

If the U.S.S.R. implements an effective system *first*, it will be able to strike without fearing devastating retaliation. It will know that its strategic advantage is likely to be short-lived. While it might well not strike us, this is hardly a situation whose likelihood we should do anything to increase.

If the U.S. implements an effective system *first*, it is extremely unlikely to use the strategic advantage and wipe out the U.S.S.R., and very likely to sit back and wait until the U.S.S.R. catches up—that is, until the stalemate is again instituted.

Whatever way it is viewed, an agreement not to deploy an ABM system, which can be effectively verified (as distinct from a ban on research and development of ABMs) is advantageous not only on economic and diplomatic grounds but on strategic military ones as well.

As regards the anti-Chinese system, the evidence that we could not neutralize a Chinese attack-system with existing cababilities is extremely unconvincing.

AMITAI ETZIONI,
Senior Staff Member.

FEBRUARY 20, 1969.

Hon. J. WILLIAM FULBRIGHT,
U.S. Senator, Washington, D.C.

DEAR SENATOR FULBRIGHT: Development of the Sentinel anti-missile system involving placement of nuclear missiles near heavily populated areas within the United States, has, as you know, aroused deep concern and widespread opposition throughout the country.

We in the UAW are deeply troubled over the implications of the Sentinel program, mainly because we believe that its dangers go far beyond the very real risks to which it would expose communities near the projected missile sites.

We do not minimize such risks; but the fundamental danger of the Sentinel ABM program is that it flies in the face of our imperative need to check the nuclear arms race, halt the spread of nuclear weapons, and move toward serious talks to de-escalate the nuclear arms race.

The President has now urged the Senate to give prompt approval to the treaty to halt the spread of nuclear weapons. In doing so, he stated that ratification would "serve the national interest" and would "advance this Administration's policy of negotiation rather than confrontation with the Soviet Union."

It would be more than ironic, it would be sheer folly, to move toward a limitation of nuclear armament among the nations on the one hand, while on the other hand escalating the arms race by building the ABM system, which would inevitably trigger a response in kind by the Soviet Union. Such mutual escalation would be particularly senseless because both countries already possess the "overkill" capacity to destroy each other's economies and centers of life.

The danger of the Sentinel program is not primarily a local danger; the overriding issue is not that of moving missile sites from one part of the country to another. The danger is national and worldwide; and the issue is our imperative need, in the President's phrase, to "strengthen the structure of peace" by making our acts conform with our words. Let our 'yes' be 'yes' in behalf of peace, and let our 'no' be 'no' in unequivocal opposition to further nuclear escalation.

The anti-proliferation treaty will become a mockery if the superpowers themselves merely utter the phrases of peace while escalating the arms race. Far from strengthening our hand in negotiations with the Soviet Union, continuation of the

Sentinel program might well be enough to doom any arms-control talks to failure before they are begun, for it would assert, more eloquently than words, an intention on our part to increase rather than scale down the levels of violence and tension in the world.

There is, in addition, another extremely important consideration. The continuing pursuit of Cold War and armament means a continuing neglect of urgent, unmet problems here at home having to do with the quality of life of the American people. As long as we act in the belief that security in the world depends primarily on the piling up of arms and only secondarily or marginally on the achievement of economic and social justice and political freedoms, we shall be diverted from the essential task of organizing a peaceful and just world community.

For these compelling reasons, we respectfully urge your association with the bipartisan effort in the Senate to put an end to the Sentinel program and to concentrate our national efforts on strengthening the structure of world peace through negotiation rather than confrontation and in dealing with our many urgent problems at home.

The UAW International Executive Board has issued a public statement on this matter, a copy of which is attached.

Sincerely and cordially,

WALTER P. REUTHER,
President, International Union, UAW.

UAW INTERNATIONAL EXECUTIVE BOARD STATEMENT ON THE ANTI-BALLISTIC-MISSILE PROGRAM

The Anti-Ballistic Missile (ABM) System, which would entail the placement of defensive nuclear missiles on sites near heavily populated centers around the country, has come under heavy attack in the U.S. Senate and from groups of concerned citizens in many communities throughout the nation.

The UAW International Executive Board associates itself with this opposition to ABM, and we commend the concerned community leaders in the Detroit area and in other cities who in protesting the acquisition of local sites by the Pentagon have drawn national attention to the dangers of this further escalation of the nuclear arms race. This citizen protest has been very largely responsible for growing opposition to the ABM system in the Congress.

We urge the President to respond to this national protest with an order cancelling the ABM program. We urge him to turn away from a useless and unnecessary arms buildup and move vigorously toward the tasks of peace.

Little purpose is served at this late date in stressing in detail the destructive power of even the smallest nuclear warhead. It requires no imagination to conceive of the degree of damage to life and property that would result in an urban center if one of the missiles slated to be installed under the ABM system accidentally exploded. A nuclear physicist told the Michigan Citizens' Coordinating Committee Concerned About Anti-Ballistic Missiles: 'If there were an accident, the Detroit area certainly would not be habitable.'

If the ABM system were demonstrably essential for the national security, it is conceivable that American might properly be asked and might well be prepared to agree to accept a degree of risk in order to place anti-ballistic missiles around our cities. No such necessity, however, can be demonstrated. On the contrary, a very strong case has been made—for the contention that development and deployment of the ABM system would actually *reduce* our security.

In the first place, the system is untestable except in the crisis of missile attack. By then it would be too late to determine its feasibility or effectiveness. Experts have noted that the very operation of the system may make it totally unworkable, since the atomic explosions resulting from its initial use in time of imminent crisis could make inoperable the very electronic gear essential to its effective deployment.

The advocates of the ABM system declare that it would be designed only to intercept and destroy low-grade and unsophisticated Chinese missiles. It would be totally useless against sophisticated missiles, which the Soviet Union already has and which in years to come China will develop. The ABM system would require at least 5 years for full deployment at a cost officially estimated to go as high as $10 billion but which might well go as high as $60 billion; and nobody, in or out of the Pentagon, has more than the vaguest notion of China's probable

nuclear capability at the end of that five-year period. Given this inability to accurately assess what the Chinese will be able to produce five years from now, it is quite possible that the ABM system would be as useless against China as it would be against the Soviet Union.

Even if we could predict the Chinese capability five years hence, it does not follow that we should spend up to $60 billion to ring our cities with megaton bombs in order to protect ourselves against a potential Chinese attack. For it should always be kept in mind that we already have the most formidable system of deterrence in the world. It lies in our capability of totally destroying any adversary, even if most of our offensive missile sites were destroyed. Both the United States and the Soviet Union have long since possessed this power of overkill. It provides a precarious equilibrium or balance or terror which has thus far prevented limited wars from escalating into an all-out military confrontation between the great powers.

This precarious balance would be disturbed by any venture into anti-ballistics systems, either the 'thin' Sentinel system or a much more expensive and destructive ABM system, which many see as the ultimate objective of some in the military. According to Dr. Jerome B. Wiesner, Provost of the Massachusetts Institute of Technology, who was President Kennedy's scientific adviser, any drastic change in the strategic balance of power takes about 10 years. The very length of time required to move to a new strategic balance after the introduction of new weapons systems, according to Dr. Wiesner, gives a kind of stability to the arms race. The new equilibrium arrived at, after a decade or so of transition, however, will be just as precarious as the old as long as we consent to remain captives of the arms race. We shall have no more essential security than we had ten years earlier, and shall have squandered scores of billions of dollars that could have been better invested in building a more just and livable society. In fact, according to Wiesner, we may well have less security. He writes:

"I believe that the situation will be made more, not less, dangerous. We always underestimate our own capabilities and overestimate that of the other fellow. I think that is true of both sides. * * * That is, if the Russians build a defense system, we think it is better than it is, so we overbuild in order to penetrate it, and vice versa.

"Thus there is the real possibility that when everything is stabilized at some higher level and we are all relaxed because we have become used to it, the potential for destruction will have gone up instead of down.'

And Wiesner asks:

"* * * Can we play this game, which certainly will not buy us real defense and at the same time achieve a rational world? My answer is no."

That is also the answer of the UAW; and we believe it is the answer of an increasing number of Americans. According to a recent Harris poll, Americans are still firm believers in a strong military defense, but a clear majority balks at paying increased taxes to beef up the military establishment. More significant is the response to the following question:

"If you had to choose, would you prefer that our government put greater emphasis on building on U.S. military power or in trying to come to arms control agreements with the Russians?"

Of a cross-section of adults asked that question, 62 percent would put "emphasis on arms control", 29 percent would put "emphasis on military build-up", and 9 percent were not sure.

The essential factor in this dilemma is that we do have to choose. We cannot continue to ride two horses, to be of two minds, which in the nature of things has meant until now that we have dreamed of peace and talked about its virtues, while remaining captives of the arms race. We must now decide to free ourselves from its burdens and its dangers. The growing bipartisan opposition to the ABM system in the U.S. Senate reflects a growing realization on the part of the American people that the only real security lies in controlling rather than escalating our armaments, in working for agreements that can reduce the level of conflict and tension in the world and help to strengthen the constructive efforts of the peacemakers rather than the negative fears of the military.

The President has urged prompt ratification of the anti-proliferation treaty in order to "advance this Administration's policy of negotiation rather than confrontation with the Soviet Union."

We endorse that appeal. But the Administration must clear away ambiguities that presently confuse its policies. The anti-proliferation treaty, even when ratified, will remain a scrap of paper if the United States and the Soviet Union merely utter the catchwords of peace while escalating the arms race. It is hypocritical, at the very least, to pledge other nations to nuclear abstinence while flaunting our own lack of restraint by preparing to spend additional billions of dollars for a new, untested and untestable ABM system. What the Administration does about the ABM system will reflect more eloquently than any words its real intentions in its search for peace in the world.

The UAW International Executive Board respectfully urged the President to let our "yes" be an unequivocal "yes" in favor of negotiation, and our "no" a clear "no" of opposition to any further development of the ABM program. We cannot have it both ways forever; if we really want to strengthen the structure of peace, we must act with courage and conscience to stop the escalation of the nuclear arms race before it ends the human race. If we really want to bring ourselves together—and hold ourselves together—at home, we must stop tearing ourselves asunder throughout the world community. Whatever the theoretical possibilities inherent in dynamic economic growth, it has been amply demonstrated that we cannot indefinitely concentrate on war and preparations for war and at the same time have enough time and energy and resources left over to accomplish the essential tasks of peace, foremost of which must be the improvement of the quality of American life and a helping hand to the less fortunate people at home and in the world; in their struggle against poverty, hunger, ignorance and disease.

SIPRI INTERNATIONAL INSTITUTES
FOR PEACE AND CONFLICT RESEARCH
Stockholm, Sweden, March 10, 1969.

Senator J. W. FULBRIGHT,
Senate Foreign Relations Committee,
Senate Office Building, Washington, D.C.

DEAR SENATOR FULBRIGHT: In July 1968, I presented the enclosed paper at the Third Pugwash Symposium "Implications of the Deployment of Antiballistic Missile Systems", in Denmark.

The last paragraph of the paper, in its section on conclusions reads:

"Efforts between 1963 and 1966 at Geneva on a C.T.B.T. showed some commendable aspects on both sides, but there have been no further discussions since 1966. With the procurement of ABM systems one cannot assume that either the U.S. or the S.U. is at the moment much interested in achieving "the discontinuance of all test explosions of nuclear weapons for all times. If a comprehensive test ban treaty were signed it would be a major advance, and a major signal concerning the intention of the nuclear powers for the future of the arms race. If it is not, the outcome of the corollary agreements to the non-proliferation treaty may turn out to have the greatest significance to the viability of the P.T.B.T., and to the motives behind its formulation. For the interaction between "the provisions and the preamble" of the N.P.T. will have much to do with the outcome of its possible review each five years, and its 25 year lifetime, in a way in which the three environment test ban has not had to face being tested. The life of the N.P.T. will in fact be dependent on the success of further arms control measures. In this light ABM and continued underground weapons testing in relation to it are implicitly and explicitly in contradiction to the N.P.T. and bode poorly for the future."

A New York Times article of February 23, 1969, by Mr. John Finney indicates that the Senate Foreign Relations Committee in holding hearings on the Non-Proliferation Treaty, has drawn the relationship between N.P.T. and further development of major nuclear weapons systems by the nuclear states; in particular at the moment, to ABM systems.

I wonder if you would permit the inclusion of this paper into the record of the Hearings volume.

Sincerely yours,

MILTON LEITENBERG.

THIRD PUGWASH SYMPOSIUM

"IMPLICATIONS OF THE DEPLOYMENT OF ANTI-BALLISTIC MISSILE SYSTEMS"

Krogerup, Denmark, July 14th–20th, 1968

(Milton Leitenberg, SIPRI)

The Interaction of Ballistic Missile Defense, the Weapons Testing Program, and a Comprehensive Nuclear Test Ban Treaty

(1) Underground nuclear testing subsequent to the signing of the partial test ban treaty.
(2) The safeguards.
(3) Abrogation and cheating.
(4) The present, the future and other related matters.
(5) Conclusion.
(6) Bibliography [omitted.]

This paper assumes some understanding by the reader of the requirements for warhead design and weapons effects testing that would be desirable, or mandatory, in conjunction with procurement of ABM systems. Information related to such requirements has appeared elsewhere. I will discuss here the interactions of such a warhead testing program and the pressures for it, and the decisions that occurred or were required in the United States for or against agreement on a Comprehensive Test Ban Treaty (C.T.B.T.) or a Partial Test Ban Treaty (P.T.B.T.). Most of the discussion concerns the interaction of U.S. congressional opinion and appearances before that body of various U.S. administration spokesmen.

I. Underground Nuclear Testing Subsequent to the Signing of the Partial Test Ban Treaty

Table one, two and three present the essential information. One notes the discrepancy in publicly released figures from official U.S. and Swedish sources. Even before 1963 and the P.T.B.T., the United States Atomic Energy Commission had stated that it does not announce all U.S., or all Soviet tests that it knows of. The AEC has repeated such statements more recently. It has become evident in addition, that at least for 1964, there are many additional very low yield U.S. tests whose total does not appear in the table. For example, between Jan. 16, 1964, and April 14, 1964, the U.S. AEC announced five tests. A search in the Bulletin of the International Seismological Centre, Edinburgh, Scotland, indicates that eight more tests took place in the same period of time. One can nevertheless say as an aside that Table I bears in some graphic way an implication and insight into the past U.S. negotiation position on on-site inspections.

The large increase in underground testing has been directly related to anti-ballistic missile warhead development and will be given further and continuing impetus by the procurement of ABM systems. Dr. John Foster, testifying in 1966 before the U.S. House Armed Services Committee on the Nike-X anti-ballistic missile system, indicated that the need for testing would continue: "Following the deployment of the thin defense one can contemplate building up the defense to be more effective against sophisticated attacks. . . . There is no question in my mind but that a series of experiments involving nuclear explosions would be of great benefit".

TABLE I.—POSTPARTIAL TEST BAN TREATY NUCLEAR TEST EXPLOSIONS

	United States		United Kingdom		U.S.S.R.		France		China	
	United States (AEC)	Sweden (FOA)	United States (AEC)	Sweden (FOA)	United States (AEC)	Sweden (FOA)	United States (AEC)	Sweden (FOA)	United States (AEC)	Sweden (FOA)
May 8-Dec. 31, 1963		14	0	0		0		1	0	0
1964	28	28	1	1	3	6	+?	0	1	1
1965	28	27	1	1	4	9	+?	2	1	1
1966	39	40	0	0	7	12	5	5	3	3
1967	27	29	0	0	4	13	3	3	2	2
Totals (1964-67)	122	124	2	2	18	40	+8	10	7	7

TABLE II.—TOTAL NUCLEAR TEST EXPLOSIONS, 1945 TO JAN. 1, 1968 (APPROXIMATE)

	Air	Underwater	Underground	Totals
United States	193	5	245	+443
U.S.S.R.	161	1	42	+204
United Kingdom	21	0	4	25
France	9	0	9	+18
China	7	0	0	7

TABLE III

	1945-63	1963 to Jan. 1, 1968	Approximate totals, 1945-68
United States	319	+124	+443
U.S.S.R.	164	+40	+204
United Kingdom	23	2	25
France	+10	7	18
China	0	7	7

Senator Jackson similarly stated, in a speech on the floor of the U.S. Senate, November 30, 1967 (Sen. Jackson is Chairman of the Nuclear Safeguards Subcommittee of the Senate Committee on Armed Services and Chairman of the Military Applications Subcommittee of the Joint Committee on Atomic Energy):

"During the past year the Department of Defense, charged with the responsibility of determing the effects of nuclear weapons, has continued to develop

methods of conducting underground tests in which results are being obtained that were previously thought impossible under the treaty restrictions. The accelerated underground test program of the Department of Defense for the next eighteen to twenty-four months consists of a relatively large number of tests on new reentry vehicles, guidance systems, and our anti-ballistic missile systems now under development. As a result, the actual detailed test program has developed into a fast moving and changing program because of numerous scientific discoveries and proposals for new testing techniques that are being developed. . . . a large number of underground tests were conducted and very significant advances made in the area of weapons technology development, new and radically different weapon design concepts, and in the science of peaceful uses for nuclear explosives . . .

"The basic aims of upcoming underground tests are for the furthering of our knowledge of weapon effects, for improving weapon reliability, increasing penetration capability, and advancing technology".

It was made clear before the U.S. Senate in 1963 that the U.S. had a large lead on the Soviets in underground testing experience, technique and capability. It was hoped that with further experience, tests of weapons up to "several hundred kilotons" might be done underground. Drs. Brown and Bradbury nevertheless estimated "up to one megaton" in 1963. Despite the requirement of emplacing weapon and instrumentation tunnels 3–4,000 feet under the ground for these tests, human ingenuity, the intense research effort, and technical instrumentation being what they are, it has turned out to be:

Much easier than anticipated to do larger underground weapons tests, now up one megaton,

Possible to gain much more information than one expected from such underground tests.

Both of these advances are of course exactly what the test ban had been meant to inhibit if not prevent. Sen. Jackson has also indicated that several of the Soviet underground tests have been of higher yield than those of the U.S. Three of these have vented. Apparently the S.U. has not taken the precaution of drilling its shafts deep enough.

Sen. Jackson also stated that $30 million had been added to the previous budget for underground testing in fiscal year 1967, and that the Department of Defense has increased their planned expenditures for underground testing by fifty percent over what they had requested for 1967. About $245 million will be spent for underground testing by the U.S. in fiscal 1968 and $314.6 million is alloted for fiscal 1969.

In order to carry out these new and larger tests, the U.S. AEC has had to open two new test sites, as the magnitude of the blasts made the old site too close to populated centers.

"The AEC and the Department of Defense determined in mid-1966 that it was essential to establish a capability for conducting higher yield tests underground than was determined to be possible at the National Nuclear Test Site in Nevada. Originally, the Pahute Mesa, at the north end of the regular test site, was thought to be suitable for higher yield tests, but experience disproved this hope and other sites have been selected. The first, still in Nevada, is about 70 miles northwest of Tonopah, Nevada, in an area named Hot Creek Valley. This area is thought suitable for going beyond the yields possible at the Pahute Mesa site. Next, an uninhabited island near the western end of the Aleutian Chain, Amchitka Island, is being developed for possible higher yield explosions".

One of the recent tests opened a 4–5,000 foot surface fissure in the Nevada desert, but the AEC has indicated it is interested in testing still higher yields and some sources have indicated that a 3-megaton underground detonation would be within safety limits.

. As the decision to procure the ABM reached a head in the U.S., there were several expressions of fear that it might be considered necessary to abrogate the treaty in order to test certain aspects of the missile system in the atmosphere. For the moment, this fear is expressed as being somewhat less. In the 1967 hearings Rep. Hosmer asks Dr. Foster (Director of Defense Research & Engineering, Dept. of Defense) about a statement he made four years before in testimony:

"Suppose the USSR were to develop a defense such that our ability to penetrate might depend on a saturation attack. For this application specially designed hardened warheads might be required. Considerable progress on such warheads can be made by underground test, but under the treaty, atmospheric experiments

to determine if the warhead actually has the necessary hardness against combined radiation and shock effect would be prohibited. We might thereby be denied assurance of such a penetration capability.

"Without saying why can you be any more reassuring about the situation today than you were in 1962 or 1963, whenever it was? Dr. FOSTER. 1963.

"Yes, Mr. Hosmer. I did indeed indicate that the important sets of experiments that one would not be allowed to do without atmospheric tests was the actual testing of the reentry vehicle to nearby nuclear explosions in the atmosphere.

"Subsequently, we have made very aggressive efforts in our underground program, and I believe that in executive session I can convince you that this is no longer a problem."

Similarly, Dr. Foster answered to a question in other hearings:

"4. If we decide to build and deploy an ABM system, will it be necessary to resume atmospheric testing?

"The answer is no. Our underground test program will assure us of satisfactory ABM warhead design, particularly for light defense deployments. There would be somewhat more uncertainty for heavy defenses".

And in the same hearings:

"Senator KUCHEL. Now, I listened to your answer just a moment ago, General, which had to do with the Nuclear Test Ban Treaty. I thought the morning newspaper attributed to you a statement that we would have to breach that treaty if an ABM system were to be the policy of our Government.

"General WHEELER. On the contrary, Senator, I believe they confused my statement with a statement made (deleted) by someone else.

"Senator KUCHEL. Well, I am going to tell you we need to straighten that out, because that shook me up.

"General WHEELER. As a matter of fact, this question of whether we could develop the ABM within the limits of the Limited Nuclear Test Ban Treaty, was asked on Meet the Press last Sunday. I answered "yes", (deleted).

"Senator GORE. Well, it shook me up as it did Senator Kuchel, and I promptly sent for a copy of General Wheeler's remark, and he did not make that statement.

"Senator KUCHEL. So your testimony would be, sir, regardless of the thinness or the thickness of an ABM system in this country, that it could be manufactured and deployed without violating the Test Ban Treaty.

"General WHEELER. This is correct, sir, and I assure you, Senator, I am not advocating that the United States violate a treaty for this purpose. I do not think it is necessary.

"Senator KUCHEL. Oh, no, I had assumed that you would have suggested it would be in our best interests to notify the other signatories.

"General WHEELER. That is right."

(This is a bit confusing as Sen. Kuchel seems to be implying by his phrasing, and Gen. Wheeler agreeing that in the case under discussion the United States should *withdraw* from the treaty, vis, "notify the other signatories", rather than *violate* the treaty).

These remarks, particularly Dr. Foster's, imply that it will be possible for the U.S. to proof test underground for the ABM weapons effects information that it feels it wants to obtain. This removes some fears for the integrity of the present P.T.B.T. On the other hand, with the procurement of the Sentinel system, the implication isn't very happy for anyone interested in entertaining ideas about the possibilities for a C.T.B.T. To press for such a comprehensive treaty while ABM systems were maintained would imply that nations were willing to freeze a confidence level on ABM destruction effects and ICBM warhead structural countermeasures. In the abstract that isn't impossible, but in the real world it doesn't seem very likely. From publicly available sources it appears that the proposed U.S. Sentinel system is far more extensive than the Soviet ABM system already deployed. The Galosh system around Moscow has not been expanded or extended to other cities, and the Tallinn system has now been excluded from ABM capability. The burden of interest in maintaining underground testing, with past numbers of tests as a criterion, will then appear to remain, as it has been in the past, with the U.S.A.

The uncertainties in the ABM system are not mostly those dealing with weapons effects. The two major uncertainties are:

computer program capable of dealing with saturation

computer programs written to take account of the actual signatures of reentry vehicles and dummies, (penetration aids and decoys)

Probably, if at all, weapons effects problems can be resolved as well underground as aboveground. If we call this class of uncertainties those that could be resolved by underground tests, the two above are much larger than those which would remain, e.i., those which cannot be resolved by underground tests, and which could be investigated more satisfactorily and cheaper in atmospheric testing. If a missile freeze were signed, the pro-testing position would loose its main arguments, though not all of its arguments unless the freeze were a qualitative one as well. With ABM installed one must remember that there will be pressures for testing the ICBM warheads which must penetrate as well as the ABM warhead. This is well understood by Congress.

". . . both with respect to ascertaining as much as possible what improvements in ballistic defense the Soviets may be able to make, and what hardening and improvement of our own offensive capability is necessary.

"Dr. Foster. Mr. Chairman, that is an extremely critical question. As you indicate we do plan to direct against Kwajalein Minuteman and Poseidon missiles configured so as to represent the most effective means of penetrating ballistic missile defenses, and we will be able to see on the radar, with several radars, just how that attack looks.

"We can, at the same time, direct one or more Spartans and Sprint, into the general area and simulate an attack, the intercept of an attack at several altitudes. (Deleted.)

"In the last three years we have had a whole series of very complicated experiments which prove, first, that our offensive warheads will work and, second, that they are as hard as we say or if we find them to be vulnerable we fix them, and then measure to see that they are indeed repaired.

"So this underground program is a very vital part of maintaining the effectiveness of our offensive force to provide a sure destruction." (Deleted.)

Perhaps the way to interpret Dr. Foster's earlier remarks is that fears for the integrity of the P.T.B.T. would grow serious if any U.S. administration really wanted to build a large ABM system. One can assume that pressures for atmospheric testing are much reduced now from their levels in 1963, due to the success of underground testing, but one should also probably assume that such pressures are felt differently on the part of those supporting the Sentinel-light ABM system and those supporting a heavy anti-Soviet ABM system. From the point of view of some observers it will be very difficult to get the last step, a *comprehensive* test ban treaty, because one is in effect asking for a cessation of research and development.

II. The U.S. Senate Partial Test Ban Treaty Safeguards

The opening two paragraphs of the Treaty Banning Nuclear Weapon Tests in the Atmosphere, in Outer Space and under Water read as follows:

"Proclaiming as their principal aim the speediest possible achievement of an agreement on general and complete disarmament under strict international control in accordance with the objectives of the United Nations which would put an end to the armaments race and eliminate the incentive to the production and testing of all kinds of weapons, including nuclear weapons.

"Seeking to achieve the discontinuance of all test explosions of nuclear weapons for all time, determined to continue negotiations to this end, and desiring to put an end to the contamination of man's environment by radioactive substances."

An additional document, though not formally voted on by the U.S. Senate nor formally appended to the treaty, are the "Safeguards Proposed by the Joint Chiefs of Staff with regard to the Limited Nuclear Test Ban Treaty".

"A. The conduct of comprehensive, aggressive, and continuing underground nuclear test programs designed to add to our knowledge and improve our weapons in all areas of significance to our military posture for the future.

"B. The maintenance of modern nuclear laboratory facilities and programs in theoretical and explanatory nuclear technology which will attract, retain, and insure the continued application of our human scientific resources to these programs on which continued progress in nuclear technology depends.

"C. The maintenance of the facilities and resources necessary to institute promptly nuclear tests in the atmosphere should they be deemed essential to our national security or should the treaty of any of its terms be abrogated by the Soviet Union.

"D. The improvement of our capability, within feasible and practical limits, to the terms of the treaty, to detect violations, and to maintain our knowledge of Sino-Soviet nuclear activity, capabilities and achievements".

Criteria to ensure the fulfillment of the safeguards were also spelled out by the Joint Chiefs.

Senator Jackson provides us with a background to the "Test Ban Treaty Safeguards":

"By way of a quick review, it will be recalled that in 1963, when the Senate committees were reviewing the then proposed Limited Nuclear Test Ban Treaty, the Preparedness Investigating Subcommittee shared with the Joint Chiefs of Staff a serious concern about the treaty and whether it would serve the best interests of the United States. The Joint Chiefs informed the Senate that in their opinion certain "safeguards" would be necessary if the treaty was not to operate against our national security interests. At the request of the Preparedness Subcommittee and the Committee on Armed Services, the Joint Chiefs developed a statement of the specific requirements to implement the necessary safeguards they had defined. . . .

"It is significant that the assurances to the Senate given by President Kennedy in August of 1963 that he would fully and effectively implement the safeguards were reaffirmed in their entirety by President Johnson in April 1964.

"The Preparedness Subcommittee, because of its role in the formulation of the safeguards, has assumed the role of monitoring the implementation and of making an annual report to the Senate on the implementation. The Joint Committee on Atomic Energy likewise has a deep interest in the safeguards implementation and for the past three years the safeguards monitoring and reviewing has been a joint undertaking. The staff members of both committees follow the safeguards throughout the year and the committee members then conduct a periodic review of progress, the latest of which has just been completed, and this fourth annual report to the Senate on the implementation of the safeguards is a result of that review. . . .

"The implementation of the Nuclear Treaty safeguards is the joing responsibility of the Secretary of Defense and the Chairman of the Atomic Energy Commission. To facilitate coordination of the activities of the two agencies in support of the safeguards, the Secretary and the Chairman, in June 1964, formally established joint procedures for the development and periodic review of a National Nuclear Test Program. That program has been developed and submitted to the President, and as directed by the President, plans for implementation are being maintained. The latest White House approval of the current nuclear test program was made in early July 1967".

I have not looked into the first appearance of the concept or proposal of safeguards, which act as the theoretical underpinning of the continued testing program. The Preparedness Subcommittee hearings referred to by Sen. Jackson took place in May, June and August of 1963. Secretary Rusk, in appearing before the Senate Foreign Relations Committee on March 11, 1963, (*6*), when negotiations were still essentially concerned with the C.T.B.T., repeatedly referred to a "safeguarded treaty". Whether he was referring to Safeguards in the sense of the Joint Chiefs or referring to on site inspection I do not know; but because the negotiations then dealt primarily with a comprehensive ban, the latter seems more likely. On September 11, 1963 during the Senate debate on the P.T.B.T., President Kennedy wrote a letter to the Senate leaders, Senators Mansfield and Dirksen, regarding the P.T.B.T. in which he gave assurances about U.S. nuclear defenses. In this letter he touched on all of the safeguards, as well as discussing other items:

"1. Underground nuclear testing, which is permitted under the treaty, will be vigorously and diligently carried forward, and the equipment, facilities, personnel and funds necessary for that purpose will be provided. As the Senate knows, such testing is now going on. While we must all hope that at some future time a more comprehensive treaty may become possible by changes in the policies of other nations, until that time our underground testing program will continue.

"2. The United States will maintain a posture of readiness to resume testing in the environments prohibited by the present treaty, and it will take all the necessary steps to safeguard our national security in the event that there should be an abrogation or violation of any treaty provision. In particular, the United States retains the right to resume atmospheric testing forthwith if the Soviet Union should conduct tests in violation of the treaty.

"3. Our facilities for the detection of possible violations of this treaty will be exapnded and improved as required to increase our assurance against clandestine violation by others.

"7. This Government will maintain strong weapons laboratories in a vigorous program of weapons development, in order to ensure that the United States will continue to have in the future a strength fully adequate for an effective national defense."

I think it would be very profitable to look for a moment to the possible origins and pressures for the Safeguards. In Dr. Teller's appearance before the Senate Foreign Relations Committee, he is the first to levy the charge that the Livermore labs have been handicapped in their test program for political reasons; he intimates that it is the Office of the President that is doing the hindering, and challenges the Senators to ask Dr. Foster, then Director of Livermore, if this is not so when he appears before the Committee. Teller also makes clear in his testimony before both committees that he has in the days preceding his appearance been to visit various Senators, Having in a personal visit in 1957 caused President Eisenhower to moderate his enthusiasm for a test ban by promising the advent of "clean" bombs, and having thrown a minor monkey wrench into the Geneva proceedings in 1959 with the decoupling theory, Dr. Teller is anything but a novice in these matters. There then occur very interesting exchanges on this exact issue of political limitations of the test program with Dr. Foster, Dr. Brown, and Dr. Bradbury (Director, Los Alamos).

Dr. Brown had been the Director of Livermore before becoming Department of Defense Director of Defense Research and Engineering. Under leading questions by Sen. Jackson, Dr. Foster admits that "During the last year, the laboratories have been under severe non-technical limitations. . . . We have had technical restrictions" and he introduces Dr. Bradbury's name tangentially in his reply. Dr. Bradbury had just been questioned as the preceding witness and stated he had had no limitations or restrictions. Dr. Brown categorically denies that there were *any* limitations, in a year that saw about 95 underground tests, about 2 per week, and implies that Dr. Dr. Foster is referring to vague project proposals that Livermore never got down as formal project requests. Dr. Brown adds that the National Security Council, (not known for its political pressures for accommodation with the U.S.S.R.), made the decisions on all test programs; and that, further, the "Teller proposal" on limitation of atmospheric test to a total of 1 megaton of fission products—which Dr. Teller had been offering as an alternative on and off for years in his testimony against a test ban—would have prevented the 1962 U.S. atmospheric test series.

There is also a very neat split between McNamara, Brown and Bradbury vs. Teller and Foster on their assessments of the 1961–62 Soviet test series and who is "ahead" in tests and knowledge derived from tests, particularly knowledge applicable to ABM problems. Dr. Teller simply insists that he feels sure or is sure that the Soviets are ahead. Only McNamara and Brown offer evidence and criteria for their assessments in terms of whether and how many *analogous* tests have been carried out by the U.S. and what may have been learned. In Dr. Bradbury's words.

"They have conducted in my understanding, and you can get this information from other sources better than you can from me, some experiments of considerable missile sophistication, but not very many.

"Very few I should think, and the primary type of experiments they have used is similar to the classical method of airdrop, observing its method and the yield. They do it on occasions and under circumstances which doesn't seem to make it obvious that they have a very elaborate diagnostic program".

Public evidence on the question of whether the Safeguards were an initiative of the Joint Chiefs, or were suggested to them, is unavailable. There is surely a widespread notion that the administration assumed that the Safeguards were the Senate's "price"—or that they actually were the Senate's price, for approving the P.T.B.T. There is little question but that they were the Joint Chiefs' price. Without the Safeguards, the Joint Chiefs would have balked, implying that the Treaty endangered U.S. security, and with the Joint Chiefs balking, there would be far more chance of the Senate balking. Though it was seldom said in so many words for public consumption, Sen. Jackson in reading the Safeguards, put it as "the Chiefs in laying down the conditions that they said were, in effect, conditions precedent on their part to acceptance of the Treaty. . . ." The aforementioned etter from President Kennedy begins as follows:

"I am deeply appreciative of the suggestion . . . that it would be helpful to have a further clarifying statement about the policy of this Administration toward certain aspects of our nuclear weapons defenses, under the proposed test ban treaty now before the Senate. I share your view that it is desirable to dispel any fears or concerns in the minds of Senators or of the people of our country on these matters. And while I believe that fully adequate statements have been made on these matters before the various committees of the Senate by the Secretary of State, the Secretary of Defense, the Director of Central Intelligence, the Chair-

man of the Atomic Energy Commission, and the Joint Chiefs of Staff, nevertheless I am happy to accept your judgment that it would be helpful if I restated what has already been said so that there may be no misapprehension.

"In confidence that the Congress will share and support the policies of the Administration in this field, I am happy to give these unqualified and unequivocal assurances to the members of the Senate, to the entire Congress, and to the country."

One further consideration relative to the Safeguards requires mention. Hearings in both the Senate Foreign Relations Committee and the Senate Armed Services Committee contain many accusations against the Soviets for breaking of the test moratorium in September 1961. They are made by Senators for and against the P.T.B.T. They are a constant political refrain, and in these discussions came to serve as the most immediate reference guide to Soviet untrustworthiness, substantiating suspicion of Soviet *intention* to cheat, and hence the motive for the Safeguards. This conception of breaking of the moratorium has also served a second but related purpose. The belief has led to a willingness to assume the probability of Soviet cheating, and thus directly to the position on on-site inspection demands in relation to a test ban treaty. This understanding of the end of the moratorium has been accepted by all U.S. students of arms control problems but one.

However, Inglis has written:

"The limited test ban was signed in 1963, in an atmosphere of suspicion arising from the fact that an informal moratorium on testing had been abandoned a couple of years before, first by the declaration of the United States and then by the sudden action of the Soviet Union, and as a consequence, there was fear that a formal treaty might be no more lasting";

and elsewhere,

"It is too often forgotten that President Eisenhower very explicitly terminated the temporary agreed moratorium on nuclear testing at the end of 1959 and that Khrushchev followed suit in declaring himself free to resume testing, so that we should have not been as surprised as we were by the Soviet massive resumption of testing almost two years later. The myth that the Soviets thereby broke an agreement is still being exploited by opponents of a test ban".

It would be rather important to have a clearer understanding of the role and meaning of President Eisenhower's statement. One begins to wonder if the Soviet breaking of the moratorium really can be considered a *cause* of the demand for the Safeguards, or a convenient rationalization for the interests of the Joint Chiefs of Staff in continued testing. In addition the stress on the Soviet "breaking" may have some psychological meaning as a scapegoat of another lesser sort. Thus Inglis also writes:

"The remarkable aspect of that episode is that our military apparatus, one part of which was squawking loudly about the dangers of elaborately contrived, small underground violations of a test ban treaty, was at the same time, without any test ban agreement to assure Soviet restraint, preparing no more than small and militarily insignificant underground tests. While the ostensible reason was to leave a favourable climate for the negotiations, we were retreating further from realistic negotiating positions. The real reason must have been largely that no profound technical urgency was felt for large-scale atmospheric tests at the rather high level of nuclear development that we had then attained.

"Yet it must be recognized that failure to go on testing when there is no test ban agreement is an anomaly. Our indulgence in the luxury of this militarily careless anomaly for the two years 1960–61, with no calamitous effects, demonstrates how terrifically exaggerated are the fears of small-scale underground evasion of a test ban. From the point of view of weapons development it would be far more sensible for the long pull to avoid such unilateral carelessness and at the same time to buy the protection of a test ban agreement with its much smaller risks of developmental advantage for the other side".

However, by the *end* of the 1961–62 Soviet test series, the Department of Defense may have been worried and perhaps felt it had been caught short. The Soviets had detonated as many tests as they had from 1949 to 1958, and several times the number of atmospheric tests that they had carried out in the longer period—essentially because they had done relatively few such tests in the earlier period. However only access to classified material could clarify how much of the U.S. margin in weapons design, if any, may have been eroded by this Soviet test series, or how much the nature of the remarks in 1962–1963 were demanded by

the domestic political scene. The present P.T.B.T. contains a clause permitting a nation to withdraw from the treaty if its national security interests so demand. This is ordinarly assumed to permit interpretation by one side of its position in relation to the other side in strategic weaponry, or in some novel development of weaponry. There has been no discussion of whether the breaking of the moratorium by the Soviets can or can not be construed under such a framework. If it could, it would at any rate have to be discussed in terms other than trustworthiness or untrustworthiness. I have seen such a discussion only once, in an excellent paper all of two pages long by Morton Halperin in *New Republic*, some time in 1961 or 1962.

III. Abrogation or Cheating under a Test Ban Treaty

It is true that no amount of reasoning or analysis of pressures and motives would undo the effects of an abrogation of the Partial Test Ban Treaty if it occurred. At the same time there has been a noticeable absence of sensible analysis concerning why a signatory might be interested in holding to the treaty, or under what conditions he would feel impelled to abrogate or cheat. There have often been intelligent, though brief, remarks on this matter by Department of Defense officials at hearings before congressional committees. However, they have always been coupled with the strongest possible recommendation for the safeguards program. There is some degree of logical contradiction between these two positions.

The following is an extensive quotation from testimony in 1963 by AEC Commissioner Seaborg:

"We must always remain alert to the fact that one side may try to acquire a superior advantage through violation or abrogation of the treaty. The effect of such an action on the other parties is decidedly less where underground testing is permitted and where an active program of worldwide nuclear test detection is continued.

"It does not seem possible to be forewarned against a surprise abrogation. Even if the 3 months' notice period for any country planning to withdraw is given, it would possibly have been accompanied by an earlier period of preparation.

"Consequently, we will pursue the most promising directions of development permissible under the treaty and will maintain a state of readiness for conducting tests in the atmosphere and other media. This readiness posture has been stated as national policy by the President.

"To minimize the slowing down of scientific developments which would otherwise provide advantages to a nation considering withdrawal, we will continue vigorous programs of development and underground testing by the weapons laboratories with strong support by the Government through the provision of necessary advanced facilities and equipment and adequate supporting staff.

"Under the test ban treaty, the Nevada test site and possibly other continental sites will be maintained on a continuing operational basis in order to support the test program which must be carried out.

"The maintenance of a state of complete test readiness, however, cannot be satisfied by the maintenance of only underground test sites.

"If another nation should abrogate, we would find it necessary to carry out promptly atmospheric and other tests—first, proof tests of warheads and systems, along with limited effects tests because they can be staged more quickly, then weapons developments tests and the more complex weapons effects tests.

"The major difference between maintaining a readiness to conduct proof tests and to conduct development tests lies in the fact that for the development tests the devices themselves must be developed to the state where a test serves the maximum purpose. This is the primary function of the weapons laboratories.

"The simplest proof test requires a safe detonation area which may be over either land or water, a vehicle for delivery of the warhead, means for determining yield, a rather large number of technically trained personnel, and logistical support.

"Similar requirements exist for carrying out development tests in the atmosphere; however, in addition, more complex diagnostic instruments will usually be required as will a complex communication system both to provide for safety and to facilitate the collection of data. Additional technical personnel and greater logistical support are obviously required.

"Thus, the readiness to resume a full-scale weapons development program after a surprise treaty abrogation involves two independent, though related aspects—the development of devices and experiments to be used in tests and the maintenance of a capability to carry out tests.

"As I have previously stated, the weapons laboratories will play a major role in maintaining a state of readiness through their development of new devices. Maintaining a mechanical readiness to conduct field tests on relatively short notice is difficult.

"Retention of a high technical test capability, however, will be assisted to a considerable extent by the continuation of an intensive underground test program. Also, under the determined and vigorous policy, which we expect to follow, no nation will be able to gain more than a temporary advantage through surprise abrogation".

An incidental problem which, it seems to me, is raised by this posture is that it would be impossible to separate these safeguards from the requirements for preparation to test by a nation intending to abrogate.

There seems to be a crossroad where underground testing, the Safeguards, and the Plowshare Program (Peaceful Uses of Nuclear Explosives) all meet. This has generally been overlooked, but may contribute some understanding to pressures behind Plowshare, as well as indicating a further general desire for underground testing aside from its role in weapons development in general and ABM development in particular.

In Dr. Seaborg's Senate testimony he states:

"Our ability to maintain a vigorous, imaginative, and productive program including the development of the necessary scientific and technical know-how is dependent on the retention of able scientists and engineers in our weapons laboratories and the attraction of new ones to the program. They must be challenged by new problems, work in a stimulating environment with adequate equipment, facilities, and other support, and have maximum opportunities consistent with national policy to test the products of their laboratory experiments and calculations.

"We will strongly support these laboratories and will encourage the planning and execution of the programs, including allowed testing, necessary to meet our requirements".

and in his summary:

"The weapons development laboratories will be provided the support necessary to maintain strong programs, including test support activities. Attention will be given to the provision of equipment and facilities required for a modern effective research and development undertaking and for maintaining the confidence and morale of the associated scientists and other personnel.

"Continuation of Plowshare development in these laboratories will contribute to their viability".

and in response to questioning:

(*Question*) "In the days before the voluntary suspension of tests, the days before the efficient testing of nuclear power underground, it was said if we could not test in the atmosphere we would not be able to hold our scientific teams together. Has this situation been ameliorated by reason of our more extensive underground testing?

"Dr. SEABORG. Yes. . . . I think that there will be a problem in keeping the laboratories strong and keeping a sufficient number of scientists together but this will be helped under this test ban treaty because of the continuance of underground testing".

The same theme occurs in a reply by Sec. McNamara to questioning:

"Senator KUCHEL. President Kennedy, in his speech to the nation of over a year ago, indicated that we would never be caught short again, as you and I hope and pray, and we are assuming that we are taking arrangements we will not be caught short again. Secondly, he indicated that there would not be a stable of American scientific brainpower available if tests could not be seen down toward the end of the road.

"Would it be your statement that since underground testing is not prohibited in this treaty that the statement of the President ought not to apply here?

"Secretary McNamara. Yes, Senator Kuchel. I think it is quite a different situation where we will be able to carry on a large number of development projects through underground tests on the one hand, versus complete prohibition of tests in all environments on the other hand. In the latter case, it would be far more difficult to maintain the vitality of the laboratories than it would be in the former case".

As is evident here and in the Safeguards statement, maintaining the weapons laboratory staffs in optimum shape is a very important goal, and testing will obviously help to further that goal.

This is not the place to discuss the interactions of the Plowshare program, a comprehensive test ban treaty, and, in addition, the non-proliferation treaty. I have done so elsewhere, (25). Suffice it to say that there are obvious interactions. Private discussions with an ex-AEC commissioner as well as public statements of various AEC officials have made clear the AEC approach to the Plowshare program. For example, Dr. Seaborg in 1965:

"I would recommend that such a treaty make it possible to include Plowshare shots. . . . I would recommend the inclusion of a provision in the comprehensive test ban treaty that would allow Plowshare.

"QUESTIONER. I take it from your statement you feel that nothing in this treaty will seriously retard that program.

"Dr. SEABORG. That is right, for a number of years. However, in a few years the treaty would require an amendment, if we were going to be able to go forward at that time to do the things that the technology would permit by that time".

and in his summary:

"Promising applications of nuclear explosives for peaceful purposes will be developed and demonstrated under the treaty. At such time as the benefits have been demonstrated, the parties may wish to modify the treaty to permit extension of the technology and benefits to all".

This view was also contained in one of the points in President Kennedy's letter:

"8. The United States will diligently pursue its programs for the further development of nuclear explosives for peaceful purposes by underground tests within the terms of the treaty, and as and when such developments make possible constuctive uses of atmospheric nuclear explosions for peaceful purposes, the United States will seek international agreement under the treaty to permit such explosions".

It has been continued most recently by Dr. Seaborg in the Non Proliferation Treaty hearings before the Senate Committee on Foreign Relations.

"Senator CARLSON. Doctor, as you well know, the construction of a new canal or improvement of our present facilities at the Panama Canal is a very current issue and one that concerns not only our own Nation but many other nations.

"What chance would we have of getting modification of the Test Ban Treaty restriction? Let's assume we were ready to use some of this material to build a sea level canal across the country. Whom would we confer with, all of the countries involved in this treaty? Whose approval would we have to get?

"Dr. SEABORG. I think in the case of the limited nuclear Test Ban Treaty, an amendment requires an affirmative vote of a majority of all the parties to this treaty including the votes of all of the original parties.

"Senator CARLSON. In other words, we built the Panama Canal, and if it now was decided that we, as a nation, wanted to build it we could not go ahead and build it under this treaty without getting the approval of the majority of the nations in this world?

"Dr. SEABORG. It wouldn't be the Nonproliferation Treaty that would be limiting this; it would be the limited Test Ban Treaty.

"Senator CARLSON. The limited Test Ban Treaty?

"Dr. SEABORG. Yes; the limited Test Ban Treaty would have to be amended in order to build a sea level canal across the Isthmus using nuclear explosives. But I do believe that the atmosphere of interest in such uses, and the increased confidence throughout the world that such a project could be carried out without any menace to the public health and safety is creating the kind of a climate that would make such an amendment to the limited Test Ban Treaty feasible, and I believe that the very act of our engaging in discussions concerning the Nonproliferation Treaty has contributed to that climate. It has become more apparent to more and more nations that we can have the benefits of the peaceful uses of nuclear explosives with essentially no detrimental effects concerning the public health and safety".

Something further should be said about the insistent presumption of Soviet cheating or the likelihood of any nation's cheating for that matter under the terms of an arms control treaty, particularly one on which everyone's gaze is riveted for it being the first of its kind in the post W.W. II nuclear era. I think a thorough treatment of this subject should be done: I will only sketch a devil's advocate position here. It should be constantly kept in mind in this discussion

that the crux of the matter is the balance between the level of seismic detection capability and the amount of weapon design related information that can be obtained from test yields low enough to escape detection. Several technical points were raised in the various hearings:

The potential violator of an underground test agreement does not know the other side's seismic detection capability and must go well *below* what he expects it to be unless he wants to run a substantial risk of being detected. Some few sites have substantially better seismic detection capabilities than the average, by a factor of 2 or 3, raising the risk still further. (One such especially good site, Mould Bay in the Canadian Artic, was recording U.S. tests in Nevada down to one kt. in alluvium in 1963.) Such low yield tests as would be required to be sure to escape present detection capabilities supply relatively little militarily useful information, so little that it is often said that *if* the test *escapes* detection one need not worry that the information derived from it will alter the strategic balance between the two powers. In a sense then, one might consider permitting "undetectable cheating". Finally, more useful information is usually derived from a *series* of tests, which would stand more chance of being detected than an individual test.

In 1963 the spectre of Soviet cheating in the upper atmosphere was also seriously raised by some witnesses (Dr. Teller). In mid-October 1963 an Atlas Agena rocket successfully placed into orbit two instrumental satellites designed for the detection of nuclear explosions in space. Additional satellites with the same function have been placed into orbit subsequently. In addition work continued on ground based detectors of nuclear explosions in space. This is therefore now guarded against by ground and by satellite detection methods, both for vehicle launch and exatmospheric detonation; but it was also pointed out in 1963 that to avoid detection and gather useful data would be very difficult. The costs would be enormously extravagant, and for the cost the information gathered would be minimal.

Aside from these technical considerations which were covered in some detail during the hearings by both Sec. McNamara and the Joint Chiefs, there are at least equal, if not vastly more important political considerations. It has been stated that an important pressure behind the interest of many nations in a test ban treaty was to reduce contamination from radioactive test debris. Concepts of cheating, and the fears of its possible strategic consequences are irrelevant if the main motive for the negotiating powers was the limitation of environmental pollution. If one could not assume that fears regarding cheating are related to weapons aspects, as they are obviously not related to pollution, one is entitled to immediately disregard any arguments presented on behalf of such fears. These could only be taken seriously in regard to weapons aspects, and therefore in order to discuss them, my following discussion presumes the motive of arms control for the P.T.B.T.

A major purpose of the treaty to most U.N. members was to slow down the nuclear weapons race. Should one side abrogate or cheat and be detected, the other side would resume testing as well, and this purpose would be lost.

The second major purpose of the treaty to most U.N. members was precisely to develop trust between the major powers so that an environment could be developed in which further arms control agreements could be entered into. Again the nation that abrogates and/or is caught cheating would eradicate this purpose. It seems rather silly to suppose that a nation would negotiate in an international spotlight for 4–5 years intending all the while to torpedo the outcome subsequently. Since the entire negotiations were carried on in the ENDC under U.N. auspices, prodded by resolutions voted on by the entire U.N. body, that nation that abrogated would pay severely on the international diplomatic front. If all it wanted to do was generate good will among other U.N. powers during the negotiations, then it definitely should not sign the treaty in the end. Breaking a treaty subsequently would engender more ill will in the opposing powers than simply not ever having suggested or taken up the matter in the first place, and simply going on testing.

It is obvious that this very price is the best reason that can be offered for cheating, as opposed to abrogation. But if a nation *decides* to cheat it is *deciding* to run the risk of being detected, which would probably earn it greater international condemnation than simply abrogating. Therefore, in *deciding* to cheat, i.e. *test*, it might as well abrogate and do it openly, earn less condemnation, test at a higher yield, at least gather more useful data, and do it much less expensively in financial cost. From a pragmatic standpoint then, in Dr. Bradbury's words:

"To me it simply seems the hard way to do something which, if you are determined to do it, you might just as well abrogate the treaty and go ahead and do it.

You will probably be found out doing it by one detection system or another, or even by intelligence methods. Is it worth taking that risk of being caught up when, as I say, to be honest is cheap and only requires 90 days."

If one major nuclear power broke the treaty it would be harder than ever to get the other to agree to anything again. The military consequences would be most serious for the weaker of the two powers, and in most estimates that is the S.U.

Little mention is ever made of the fact that the S.U. is *interested* in limiting further U.S. weapons development.

Anything the S.U. can do, the U.S. can do at least equally well. Yet the S.U. seems never to raise the matter of U.S. cheating, nor does anyone in the U.S. Aside from the technical risk of being caught, the enormous official U.S. and Senatorial stress on cheating seems at best enormously overdrawn, at worst entirely meaningless.

IV. The Present, Future, and Other Related Matters

1. It is often said that the political motivation for a three environment test ban was to limit radioactive pollution. This belief exists on the part of many, and it can only be stated, and noted that it is in some contradiction to the discussion of the treaty in this paper solely in terms of its weaponry aspects.

Of all arms control measures, perhaps the main international support of the smaller and non-nuclear nations is for a comprehensive test ban; they have become educated on the technical background of the issue perhaps more than on any other. It would directly respond to their request that the nuclear nations restrain their weapons program.

Whether the U.S. government at any time intended to sign a comprehensive test ban including limitations on underground weapons tests seems to be an open question. The historical evidence is reviewed elsewhere (25, 1, 2, 3). The 1963 "mistake" in Geneva on the number of inspections (3, 22) might have occurred and cannot be absolutely ruled out. It is very unlikely, but not impossible. There are very strong indications that the U.S. test detection capabilities are better, or far better, than have been publicly admitted. The classified U.S. test detection systems add an additional unknown quantity to this capability, and it is not too difficult to guess at what the classified capability might comprise. Sec. McNamara's testimony, carefully analytical in terms of its military advantages to the U.S., perhaps needs some evaluation in terms of the nature of its audience and purpose. Research and development remain the very last things to be limited in disarmament postulates. Militaries will be very reluctant to give these up, and that is what underground testing is. Such reluctance will appear in the split in motives, in utilities to be expected and anticipated.

There is surely some evidence which speaks against such U.S. intention. Little of the evidence derived from testimony by official U.S. government spokesmen in support of the partial treaty can be gratuitously assumed to simultaneously apply to what the same spokesmen might have said in support of an underground test ban as well. Some officials and departments that supported the partial treaty, with or without reservations (the Safeguards), surely would not have supported an underground ban as well. It is possible that the U.S. would have signed either treaty, but that the Senate might not have ratified either treaty. In that case would the government have signed a treaty on which there were doubts about its ability to insure ratification. There are no answers to these questions without access to authoritative sources. Without such access one may be left free to assume that the issue was continuously in doubt, that a final decision may not ever have been reached, and that certain major sectors in the administration that were at varying times known to be against an underground ban may have been strong enough to stalemate the situation, if not to have caused a decision in the negative to be held. There is no evidence that would detract from the conclusion that the official U.S. government position was to sign a three environment (partial) test ban treaty once it was willing to consider such a ban alone and not as part of a package proposal containing other measures.

2. Nearly all discussions of the test ban treaty imply or state explicitly that development of nuclear weapons is impossible, or nearly impossible, whatever that means, without testing. Discussion of this topic is impeded, not necessarily unhappily, by classified information, yet is has never had adequate treatment in the arms control literature. The only references to the minority view that I have found are Iklé, Lapp, Kramish, and a Rand report. Kramish states:

"Experience gives us no reason to expect that a nation's first atomic device, based upon a simple and tried design, will fail. If a nation is reasonably confident

that it has the recipe for the Nagasaki bomb, and feels confident of the results of preliminary testing of non-nuclear components, we can be reasonably sure that its device will explode. . . . Only by dabbling in advanced nuclear designs, seeking to increase efficiencies, adapting warheads, etc., does one incur substantial risk of failure."

Without training in nuclear physics and experience in the inner councils of the Nth nations it is impossible to reconcile these very divergent positions, and it seems to me to be a desirable issue on which to have as little uncertainty as possible. People with experience in weapons design often tend to feel that a crude design would work, without testing, but simultaneously feel that no military would be willing to use an untested weapon. To what degree such feelings derive from ways of military thinking inherent in the major powers, and perhaps less resolute elsewhere is unknown. To what degree such opinions will hold 25, 50 or 100 years from now is also unknown. An untested weapon would have less credibility in the context of deterrence, less nuclear club impressiveness, and the opponent could always hope it would not work, but it nevertheless might have some relevance in all these areas. The degree to which all observers agree that nuclear weapons *are* within the technical capabilities of the first rank Nth nations is an indication of the evaluation problem that would arise if 1, 3 or 6 of these countries announced after x years that they had fabricated an untested weapon. This cursory discussion may not be on the firmest of grounds, but these are problems that are likely to arise with time, and the interest and value in halting proliferation of nuclear weapons is not relegated to the next 10 years only, but to the next 100 as well.

3. There seems to be a direct connection between Plowshare and the Safeguards program.

4. With above ground testing each side was at least able to monitor the other's atmospheric tests, and from fission products and other data, was able to make some assessment of the other side's weapons development. In addition to '"designing around" resulting uncertainties for offensive weapons systems by redundancies and improvements on individual components, which in effect serves to increase the effectiveness and lethality of offensive systems, inability to monitor the other side's underground tests may also have produced an untoward effect further accelerating underground testing programs. Uncertainty breeds insecurity in arms races, insecurity breeds fear, and fear over-compensations; one such over-compensation perhaps being excessive underground testing.

5. Maintaining maximum readiness to test as a safeguard fulfills simultaneously every requirement for maximum readiness to abrogate. The Safeguards program, albeit designed to obviate being "caught short" again should the other side break the treaty, as the U.S. indicates occurred in 1961–62, at the same time seems to be a classical example of how to run the maximum risk on "how does it look to the other side," i.e., in being read as a signal that was not intended.

V. Conclusions

One is left with the question of exactly what the *partial* test ban treaty may have achieved of its original intentions as regards the major nuclear powers. As far as inhibiting testing, retarding offensive nuclear weapons development and ABM, in 1968, five years after, the answer is absolutely nothing, unless one assumes that the situation would now be yet worse if atmospheric testing had continued. The treaty may in the future have some effect on making development prohibitive or at least far more difficult for non-nuclear powers, unless such nations renounce the treaty.

There seems to be some analogy possible between the partial test ban treaty and the post World War I arms race situations, in that certain nations were willing to request limitations for others but not for themselves. If the analogy is acceptable, the lesson from 1920–35 is that this is not the most likely avenue to success. It was recognized in 1963 at the signing of the P.T.B.T. that unless further progress was made, the benefits from this treaty would diminish with time. As regards the major nuclear powers, the benefits have not only been diminished but totally eradicated, and probably rather faster than anyone had expected. Again in the negotiation of a Non-Proliferation Treaty the major nuclear powers have disregarded the repeated requests of the "eight" in the ENDC and of other non-nuclear U.N. members for agreements for limitation of offensive missiles, limitation of fissionable materials production, prohibition of ABM, reduction of nuclear weapon stockpiles, etc., in short, on moves which abate or even invert the direction of the U.S.-S.U. nuclear arms race.

Efforts between 1963 and 1966 at Geneva on a C.T.B.T. showed some commendable aspects on both sides, but there have been no further discussion since 1966.

With the procurement of ABM systems one cannot assume that either the U.S. or the S.U. is at the moment much interested in achieving "the discontinuance of all test explosions of nuclear weapons for all times." If a comprehensive test ban treaty were signed it would be a major advance, and a major signal concerning the intention of the nuclear powers for the future of the arms race. If it is not, the outcome of the corollary agreements to the non-proliferation treaty may turn out to have the greatest significance to the viability of the P.T.B.T., and to the motives behind its formulation. For the interaction between "the provisions and the preamble" of the N.P.T. will have much to do with the outcome of its possible review each five years, and its 25 year lifetime, in a way in which the three environment test ban has not had to face being tested. The life of the N.P.T. will in fact be dependent on the success of further arms control measures. In this light ABM and continued underground weapons testing in relation to it are implicitly and explicitly in contradiction to the N.P.T. and bode poorly for the future.

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War and Peace and the United Nations, an Exclusive Interview With General Dwight D. Eisenhower

(By Mary Kersey Harvey)

I went to him in Gettysburg—during the midst of yet another crisis which had come near to reducing the UN to what its friends had feared and its critics predicted—an arena for shouting matches between sovereign states.

I went to Gettysburg to seek the President's views on what can and needs to be done to transform the UN into the limited federated world government he had said—in 1948—was a central requirement of peace with justice.

What he had to say during the course of our extended talk that winter morning surpassed anything I expected. Indeed, if Grenville Clark was the prime theoretician of world order, Dwight Eisenhower is its greatest strategist. For to back up a world organization with revised and more equitably apportioned legislative and executive branches, President Eisenhower would give the UN tactical nuclear weapons, while denying them to anyone else. But let's begin at the beginning.

Prior to my arrival in Gettysburg I had prepared for our interview by recalling many of the pointed comments that had been made concerning the UN and world peace during the last twenty years. Particularly I had refreshed my memory concerning General Eisenhower's many pertinent speeches on the subject during his long years in public life.

"What hope can there be for the future of the world unless there is some form of world government which can make its effort to prevent a renewal of the awful struggle through which we have just passed?" Churchill asked in 1950.

In 1961, John F. Kennedy told the UN: "The risks in disarmament pale in comparison to the risks inherent in an unlimited arms race." He called for "a peace race in which the Russians would advance with us, step by step, toward general and complete disarmament."

In 1961 the Soviet Union proposed:

"In order to make it easier to reach agreement with the Western powers and to prevent the control question from becoming an obstacle * * * the Soviet Government has stated that if the Western powers will accept the proposal on general and complete disarmament, the Soviet Union will unconditionally accept those Powers' proposals on control."

Long before these bold words were spoken the then General Eisenhower had already grasped the nature of the requirements of world order. In 1948 he wrote: "During the war it was demonstrated that international unity of purpose and execution could be attained, without jeopardy to any nation's independence, if all were willing to pool a portion of their authority in a new single headquarters with power to enforce their decisions. In the formation of the new United Nations * * * this lesson had not yet been accepted. Its application would have meant some form of *limited federated world government.*"

Because the nations had not accepted this lesson, a defective child was born at San Francisco in June, 1945.

Twenty years later in St. Louis, President Eisenhower joined with President Truman for a celebration of the UN's twentieth birthday. At a press conference following the ceremony, President Eisenhower's praise of the work of the UN's special agencies was published widely. But when the President stressed the imperative need for strengthening the world organization without delay, it went unnoticed by all but a few.

Between Dwight D. Eisenhower's statements of 1948 and 1965 lay two peaceful terms as President of the United States. What had he thought, said and done, as leader of the world's most powerful nation, and as the single most respected and admired public figure in the world, to "wage peace"?

Plenty.

From the very beginning of his Administration, he unremittingly sought creative proposals that might lead to progress toward genuine peace. He initiated the cultural-exchange program with the Soviet Union. He took the initiative

in calling a halt to the Anglo-Israeli aggression against Suez, but warned the Soviets against any attempt of theirs to intrude by force. He vetoed military intervention in Laos. And made proposal after proposal aimed at disarmament and a world security system based on law.

During the weeks of torturous preparation of one of his major peace speeches ("Chance for Peace," 1953) he was determined that what he said would be more—far more—than just a jumble of platitudes. The world was sick of hearing its leaders' smarmy-mouthed rhetoric. They demanded more than a forced trip on the nuclear collision course.

In "Chance for Peace" President Eisenhower declared war—total war—not upon any human enemy, but upon the brute forces of poverty and need in the world.

"The cost of one modern heavy bomber is this: a modern brick school in more than thirty cities * * * We pay for a single destroyer with new homes that could house more than eight thousand people.

"This is not a way of life * * * Under the cloud of threatening war, it is humanity hanging from a cross of iron.

"This government is ready to ask its people to join with all nations in devoting a substantial percentage of the savings achieved by disarmament to a fund for world aid and reconstruction."

At the height of the second presidential campaign, a few days after Anglo-Israel forces moved on the Suez, the President, well aware of the possible domestic political consequences, went grim-faced on national television and explained why compliance with the United Nations' call for a cease-fire was imperative. He then re-stated his belief in the need for giving the UN more muscle;

"The United Nations represents the best and soundest hope for peace in the world. . . . For this very reason I believe that the processes of the UN need further to be developed and strengthened.

Dwight Eisenhower knew then, as he knew in 1948, and knows today, that the world could not and cannot afford the danger of relying on voluntary compliance with UN resolutions and injunctions.

A few months later, facing masses assembled at the Capitol for his second Inauguration, President Eisenhower again sounded a grave, but hopeful note:

"The building of * * * the peace is a bold and solemn purpose. To proclaim it is easy . . . To serve it will be hard . . . We must be ready to pay its full price * * * One truth must rule all we think and all we do."

And at the convening of the fifteenth session of the UN General Assembly the President affirmed with utter clarity his mounting concern about the need for giving the world body power to enact and enforce law binding on all nations:

"Thus, we see as our goal, not a superstate above nations, but a world community, embracing them all, rooted in law and justice."

Dwight Eisenhower's horror of war and restless hope for peace over so extended a period of time is unmatched by any other U.S. President of our time.

It felt like snow as I walked the path to the President's offices at Gettysburg College on the morning of November 7th. The President—who had been up before dawn—had already hiked to the polls, cast his vote and dictated several letters by the time I arrived for the 9 o'clock meeting.

The President was somewhat thinner than when we last met in 1963 at dinner at the Eisenhower farm, but he was every bit as earnest, enthusiastic and ebullient. It was going to be difficult to keep track of everything he said. Thoughts, stories, quotations, references to history, dates, crises, names, technical terms, numbers—all cascaded forth with a briskness, accuracy and intensity characteristic of few men of any age.

I was clutching my worn copy of "Waging Peace" along with other papers and memory-refreshers. That book had been a devil to write, the President said. The research part of it had been tremendous and tedious. He thought he would never get through it. His eyes twinkled a bit as he settled into his chair and talked about his new book, "At Ease". Now that one had been fun to write. It was just like telling stories to friends.

It was fun to read, too, I told the President. But more than that, it helped us to understand the roots of his intense hatred of violence and war. This hatred was intrinsic. A story that had etched itself deeply in my mind had to do with the six-year old Dwight's reaction to the sight of his brother's whipping. He had broken into tears and cried out "Stop! Please stop! Even a dog shouldn't be treated like that!"

The President knew why I was there. Paul G. Hoffman, director of the United Nations Development Programme, had explained to him that readers of VISTA

and United Nations Associations publications in 65 other countries were well aware of the great services performed by the UN's ancillary agencies, but were becoming increasingly concerned by its weakness with respect to its central function: prevention of the threat or use of force against the territorial integrity of member nations. What the President had to say would be read by the many members of these United Nations Associations throughout the world.

I handed the President excerpts from a recent New York *Times* editorial which said in essence that many of the more responsible powers were now doubting—more than ever before in its history—whether continued membership in the UN was in their best interests. It further said that they feared that unless procedures were changed to conform with the UN's changed character the organization would not survive.

I then expressed my own somewhat stronger concern that the organization might be torn apart because of the inability of its sovereign members to make objective judgments, dispense justice, and enforce decisions on a world scale, thus leaving our interdependent world without the machinery to prevent drift and anarchy.

The President read the editorial carefully, took off his glasses, and turned to me, leaning forward in his chair. He spoke with great earnestness. There were, it seemed to him, many valid reasons for concern, although some voices are predictably gloomy. We had to keep in mind the civilizing and healing effect of the UN special agencies.

But, he added, history shows invariably that associations of sovereign nations (and he emphasized the word "sovereign") never achieve the results that idealists and indeed practical people expect them to. The President gave NATO as a recent and stunning example of this. It had worked only so long as all of its members were willing to go along. But there had been no way to prevent its members from unilateral action, from pulling out when it appeared to be in their national interest.

The point the President was making was that the UN, in reality, was a world treaty group. Its members were no more bound to abide by it than members of regional treaty groupings. National sovereignty, one got the feeling, was to the President the main villain of the piece. (Peace, too, for that matter.)

The President, in "Waging Peace" had said that "of the various Presidential tasks to which I early determined to devote my energies, none transcended in importance that of trying to devise practical and acceptable measures toward universal disarmament."

What he meant by "universal", of course, was disarmament by all nations of the world. Would this still be his number one goal, I enquired? Universal disarmament, the President answered, would not fully assure peaceful settlement of all international issues, but it would certainly (1) lessen the diversion from useful purposes of resources, money and manpower, and it might save sufficient resources to meet many of the basic requirements of the world's impoverished, and (2) eliminate the chances of a world cataclysm and the extinction of civilization. Disarmament, to the President, was a step—certainly a major one—toward the greatest of all goals: a just peace.

The next question had to do with the prodigious efforts mady by the Eisenhower Administration to come up with disarmament proposals which would be effective and acceptable, not only to our Congress and to our allies, but to the Soviets. These efforts had been continuous and unremitting, strenuous and consistent.

Now, some seven years had elapsed since his Administration's final and comprehensive plan for disarmament had been placed before the world in 1960. No meaningful progress toward universal disarmament had been made during those seven years. In fact regression had characterized the period. The arms race had escalated. There was one full-fledged war in the field, others threatening. How did the President account for this deplorable record?

With hesitation he snapped out his answer. The failure could be laid directly to the war in Vietnam. You cannot be fighting a war and negotiate effectively about disarmament at the same time.

Now there were those, of course, who might have answered the question in another way, he went on to say. They would lay the failure to the Soviet's various and varying stances on inspection. Back in the days of Stalin, the President explained, the Russians' justifiable fears of war and of opening their country to foreigners were about proportionate.

Stalin had once told him, the President went on, that no major projects, i.e., massive hydro-electric plants, dams, and the likes would be constructed until

the chances of their destruction in another war had diminished to a reassuring degree. Thus, the President told me, when the Russians—after Stalin's death—began construction of many massive and costly projects—he came to the conclusion that they no longer feared attack and would be amenable to a disarmament plan which contained some, but not excessive inspection. He still felt justified in having reached that conclusion. Of course, he added, the Sino-Soviet relationship now makes it difficult for the Russians to talk disarmament with us, just as our involvement in the Vietnam war makes it difficult for us.

I wondered if the President was disturbed about the very real possibility that a number of smaller nations would soon acquire nuclear material and the means for its delivery. Would this not represent a horrendous threat to world stability? As an example, I wondered what would have happened if either or both the Israelis and Arabs had possessed even a few nuclear weapons during the June clashes.

The President pointed out that he had proposed, early in his Administration, that the small and middle-sized countries be provided with nuclear know-how. With this would have come a sense of maturity and responsibility, he said. Too, if all nations now possessed nuclear capability they might be more willing to talk seriously about universal disarmament.

Next question. As a five-star General, and as a President elected by Republicans who, to a large extent, dominate the nation's industry, the President had astounded that country with his warning against what he bluntly termed "the military-industrial complex."

In his Farewell Address, the President had sternly emphasized that—

"The conjunction of an immense military establishment and a large arms industry is new in the American experience. Its total influence—economic, political, even spiritual—is felt in every city, every state house, every office of the Federal Government.

"We must not fail to comprehend its grave implications. We must guard against the unwarranted influence * * * by the military-industrial complex. The potential for the disastrous rise of misplaced power exists and will persist."

Was there, in the President's opinion, any connection, however, minuscule, between the "persisting power" of the military-industrial complex and the failure of disarmaments efforts? The President slumped back in his chair, let his arms hang limply at his sides. His answer came slowly.

He reminded me that as far back as 1930 he had been assigned to work on a Commission to take the profits out of war. Bernard Baruch had been his "mentor". But it was vastly different in those days. Whether wars were of long or short duration, a long period of peace was confidently anticipated. When they were over, industry promptly began to re-tool for civilian needs. This was costly. And, moreover, not all industry became involved in war production. Those that did suffered by losing their consumer-oriented production capability as well as their customers. There was, except in special cases, no appreciable profit in war then. Nothing comparable at all to the profits today.

Moreover, the President said, we have a situation now where whole segments of the economy and the society are partially or totally dependent on the billions of dollars flowing to them from Washington. Possibly $35 billion for hardware alone! he exclaimed.

These fellows couldn't get out of it if they wanted to, the President was afraid. Would he, I asked, go into some detail about the component parts of the military-industrial complex? Who were they? Where were they?

Well, to begin with, there were the politicians. Every Congressman, the President explained, wants air bases, aerospace contracts, R&D establishments, military camps, and the like, for his state. And what's more, once he's got these things for his state, he'll fight to the death to see they aren't dismantled, even when they no longer serve their original or any real purpose. You hear the rumblings on the Hill every time McNamara wants to close a shipyard or an airbase. Another group in the complex, the defense contractors, not only work through their Congressmen, but court the Pentagon directly.

It has even gotten into the universities, the President said ruefully. Not long ago Dr. Wriston, former president of Brown University, had told him that if Federal grants for research relating to military and para-military matters were to end, almost every university would have to close shop.

This was a deplorable state of affairs, the President continued, but prevailed on many campuses throughout the country. Only those private institutions with enormous endowments (The Johns Hopkins University, of which his brother Milton was president, was one) can take that Federal research money or leave it.

Another part of the complex: the very institution from whence Eisenhower had sprung. Every branch of the Armed Forces demands and sometimes gets more than it needs. Then, the President went on gloomily, there are the unions.

Contrary to what most people think, the nation's largest industrial employer is not the automotive industry. It's the aerospace industry. It employes 1,384,000 workers. Four-fifths of its sales are to the Federal government. Its workers and particularly its scientists are certainly an important component in the complex. Then you've got the electronics, ordnance and petroleum fellows, all with very real interests in the continuance of the war machines.

They are justifiably afraid of arms cutbacks, we agreed.

What then, I asked, was the alternative?

The President cheered up a bit. In a spiritual fashion he began to develop an analogy between the condition of American military-oriented industry when arms spending ended and that of the European nations whose production facilities lay in ruins after World War II.

The President spoke of the ingenious way in which Paul Hoffman, as administrator of the Marshall Plan, had operated. To Hoffman's way of thinking, our government's various bureaus and agencies would be the last to know the requirements of the various devastated European industrial complexes. And so Hoffman went to them and said in essence: draw up your *own* plans for reconstruction and recovery. You know better than we do what is required. Then get up a budget. How much can you lay out and how much help will you need from us?

That, the President said, accounted for the speed and efficiency of the recovery of the European industrial community. He would think that comparable measures could be effective with respect to the American military industrial community when arms spending halted or diminished sharply.

At the risk of dwelling too long on the issue of armaments and disarmaments, I posed one final question in this area, because it could best be answered by a man whose vast knowledge of military affairs and arms is equally matched by his passion for peace. There is probably no man with comparable qualifications in the world.

We were now spending $87 billion of our total Federal budget of $135 billion on arms or defense, call it what you will. These figures made the military budget during his Administration look like carfare. The President had written, again in "Waging Peace," that "so long as such proportion of the world's assets are wasted on excessive arms, our ability to help poorer people will be sorely and uselessly impaired."

Question: Would the $5 billion antimissile missle system recently announced by Secretary McNamara fall into the President's category of "excessive arms?"

I wasn't prepared for his vivid response. Five billion! That was only the beginning, the President said impatiently. It would buy a pilot establishment, nothing else. And then we would have to go on and on until we had "the works." He drew a spiral in the air with his forefinger as he talked. You'd get up into the $20 billions, then the $30 billions, and the $40 billions—just for the United States. Every little town and locality would insist on having a shield. Even Gettysburg. And, soon, too, all your allies will insist on having it. The President had continued to trace the spiral until it had gone as high as his arm could reach. Right *now* our arms expenditures create economic difficulties, he said in a hard tone, as his spiraling arm dropped to his side. But, as of now, it is possible that we will have to take on this great additional cost.

He paused, swiveled to gaze out the window at the wind-stripped trees, and finally turned back to finish up on the anti-missile missile. He thought the value of the project was still questionable. Now, mind you, the President said, I wouldn't call it a form of excessive arms, *if* I thought it would be effective. But I tend to agree with McNamara when he minimized the need for the thing. If it's a "thin" defense, as they now describe it, it won't appreciably improve our defensive posture. And, anyway, it's still axiomatic that the best defense is a perfect offense. We've got *that.*

We then moved from the unthinkable, the madness, the insanity—to the sane.

It was time to discuss what the President had meant when he said in 1956 "there can be no peace without law." Two preliminary questions about basic assumptions: (1) Did his use of the word "law" in the context of world peace imply the law of a world authority, capable of enforcement, as distinguished from a mere set of exhortations or injunctions, and (2) did the proposition "no peace without law" embody the concept that peace cannot be assured by a continued arms race or an indefinite balance of terror, but only by universal disarmament, together with establishment of institutions in the world corresponding to those which maintain law and order in our country and others?

Obviously, the President replied rather impatiently, that was the kind of law he had spoken of when he said it was essential to world peace. I said I had suspected my two questions about assumptions would be unnecessary, especially in view of the President's uncompromising stance during the Suez crisis of 1956 when he emphasized that there could be no double standard of law in the world, i.e., one law for those opposing us, another for our allies. There could be only one law, the President had insisted then, or no peace. Many in the world believed his stand had prevented World War III.

To get that "one law for all in the world" Grenville Clark, a prominent American lawyer, champion of civil liberties and of peace through world federalism, had drafted a set of changes that could be made in the UN Charter and which would provide the UN sufficient authority to prevent war. That authority, Clark had made clear, would be *strictly limited* to war prevention. I hoped we might now go over some of the main provisions of the Clark proposals.

The President anchored on his glasses the better to study the Clark formula for the UN legislative body. It would eliminate the one vote-per nation provisions in the General Assembly, for one thing. Secondly, nations would be given voting power according to a formula which took into account population and geographic factors. Assuming an eventual membership in the UN of about 130 nations (all nations now members, plus those expected to join) Clark had calculated a voting arrangement that goes like this:

Nations	Representatives each	Total votes
4 largest	30	120
10 next largest	12	120
15 next largest	8	120
20 next largest	6	120
30 next largest	4	120
40 next largest	3	120
10 smallest	1	10

The President scrutinized the formula most carefully, then whipped off his glasses. There was no doubt, none at all, he said, that we have gone overboard in bringing into the UN certain sovereign groupings which have no valid claim to nationhood. Groups which were not economically and/or politically ready for nationhood and a vote in the UN. But it was not entirely or even largely the fault of these new nations. It was partly the fault of the larger powers. They had expected too much, too much in too short a time.

The President was reminded of a story. Back in 1959 DeGaulle had brought together the prime ministers of ten or eleven African countries of the "French Community." He had asked the President to address them privately. He decided to begin with a question. In view of the fact, the President had asked the African leaders, that the world was becoming increasingly economically interdependent, why did they want to go it alone? And had they considered what they stood to gain if they would unite in some kind of economically-oriented regional federation?

Well, the President said, they just wouldn't buy it. They each wanted their independence. And the reason they gave: it would get each of them that one vote in the UN. The idea of forming a powerful, regional African grouping had no appeal. Now, it might have had appeal if the voting powers of UN members were apportioned on a more realistic basis.

The make-up of the UN, he went on, is discrediting the organization. How can the General Assembly function with one vote for each nation? The United States has the same voting strength as the Maldive Islands with—what was their population?—less than 100,000? It was like giving Rhode Island the same number of Representatives in the Congress as Texas or California or New York, It had been and continues to be a mistake to admit nations to the UN unqualifiedly.

Now that led to the Security Council, the President continued. It wasn't doing its job, either. Couldn't do the job, with the veto. Why couldn't some majority voting formula be worked out?

He replaced his glasses as I handed him the Clark formula for changing the composition of the Security Council.

It would be as follows:

> The executive body be enlarged to seventeen members, each elected to a four-year term by the General Assembly, The U.S., U.S.S.R., China and India would have a representative at all times. Four of the eight next largest nations would, in rotation, be entitled to membership, with the proviso that two of these four members should always be from European nations, the other two from nations outside Europe, The remaining nine members would be chosen by the General Assembly from the other member nations.

A simple majority would be ruled out. A majority of 12 out of the 17 votes would be required for all but the "most important" decisions. In these cases. Clark proposes that the majority of 12 must include a majority of each of the two main groups of nations, i.e. the large nations and the much more numerous groups of smaller nations. The President thought it all made a great deal of sense.

After going over the Clark proposals for compulsory jurisdiction by the International Court and the establishment of a World Equity Tribunal to arbitrate cases where legal principles were not applicable, we moved on to the actual disarmament phase. The Clark plan, if adopted and ratified, calls for an immediate and precisely calibrated move toward universal disarmament.

The re-configured Security Council would appoint an Inspection Commission to consist of five persons, none of whom would be a national of any of the twelve largest nations, and no two of whom would be nationals of the same nation.

They would conduct a worldwide Arms Census, supervise an arms production truce, and eventually supervise and verify by inspection, phased, proportionate disarmament which would leave all nations as equally strong or weak during the disarmament period as they were prior to it. The gradual and proportionate giving up of military forces and weapons would take place over a period of ten years at the rate of ten per cent per year.

Rather startling, the President's response to this part of the Clark plan was, in essence, why wait? Of course the main goal is complete disarmament. But why not run some experiments now? Let's open up all our bases, nuclear launching facilities, arms factories, the works—all of it located on or west of the Mississippi and invite the Russians to come in and look around. On condition, of course, that they would open up everything they had located on or west of the Vistula River to inspectors from the United States.

Now these inspectors would soon begin to understand the size and dimension of the problems of inspection and verification. They could learn a lot and then work together to develop a formula which would be workable and acceptable to both sides, and to the other nations, too.

The President didn't see why we had to wait for full UN Charter revision. He knew, as only a military man knows, that such an experiment as he had just put forth could pose no real threat to the security of either side. We must try! the President urged. Try and keep trying!

The disarmament phase of the plan for a world security system was but a relatively short-term proposition. The concurrent build-up of weapons, men and material for a UN Peace Force would lead to a permanent establishment—a military one—within the UN. The President's thoughts on this would be most enlightening. In essence the plan was this:

> The United Nations Peace Force would be a heavily-armed and well-disciplined world police force. To prevent domination of this Force by any nation or group of nations, the number of nationals of any nation in its standing component would not exceed three percent of the total strength of the Peace Force except in extreme emergencies. Units would be dispersed to avoid power concentrations, would be highly mobile, and would be located in defensible positions. *None* of them would be stationed in the larger countries. The UN military staff would be under civilian control.

The President studied the above plan quickly and, as I had expected, caught the ball and ran with it. You'd have, he began to plan out loud, world Marshals, comparable to our U.S. Marshals. Backed by armed forces similar to our National Guard. When the U.S. Marshals go into a troubled area, if they can't handle it, if they can't get compliance with Federal law, the Guard can be called in. You'd have the same thing on a world scale. Non-compliance with UN law and you send in the UN forces. He orchestrated this point at some length.

And too, he hammered away, the UN needs *nuclear* power. He bore down hard on the word "nuclear." The UN can't keep the peace with conventional weapons alone. The President, out of his enormous storehouse of military experience and knowhow, put forth some brilliant innovations on Clark's Peace Force plan. You know, he said, way back in 1953 I proposed that the nations turn over all nuclear weapons to the UN, keeping only that nuclear material necessary for peaceful purposes. The ultimate aim of my proposal at that time was to get those blasted bombs out of the hands of the nations and into the hands of an impartial world body.

The President went on to outline, specifically and vividly, how the UN would use its nuclear power, without anyone getting hurt. Take this example, he hurried on. You have two countries in a border argument. The UN orders the matter to be taken to the International Court. One or both of the disputants refuses to submit to compulsory arbitration. They build up their troops along the border.

Then your UN aerial surveillance teams report that armed outbreak is imminent. The UN, which by now has in its possession a fleet of submarines armed with nuclear missiles deployed around the world, orders one of the submarines to proceed to the area. The world is then told that if firing breaks out for any reason whatsoever, a tactical nuclear weapon will be delivered onto the disputed territory. If this threat fails to prevent armed conflict, you back it up with action.

But, the President quickly added, no nuclear bomb would ever need to be delivered, he felt sure. The threat would be sufficient to roll back the opponents from the border—indeed all the way back to the International Court at The Hague.

There can be no effective supernational organization *without power*, the President emphasized. He had said that in 1953 at the United Nations and he insists on it today.

We fell silent for a moment. Was the President thinking about the possible shock effect his ideas might have in some quarters? Grenville Clark had often said that what the world probably needed to get moving on disarmament and world law was a series of severe shocks. As to my own thoughts during those brief silent seconds, it seemed to me that what the President was really saying to the UN and about the UN was: Get tough! Diplomacy, kid gloves, cadenced speeches, behind-the-scenes deals, have not worked and won't ever work! Demand the men and the weaponry you require to do the job. Get tough! Get tough!

It came then, down to this: How do you get from here to there?

The President had long been guided by the early period in our national life and the men who shaped it. Would it be stretching the point too much, I asked, to equate the Articles of Confederation and the problems of the thirteen original states with the present UN Charter and the problems of the 123 nation-states today? And, if an equation could be made, could the President then agree that a UN Charter revision conference, similar to the Constitutional Convention of 1787, might result in the carving out of a Constitution for the World, as strong, equitable and sound as the U.S. Constitution?

The famous grin broke out. Here was, he said, an analogy which many Americans would understand and accept. The President then spoke, as though he had struggled right along with Jay, Madison, Washington, Hamilton, Franklin and the others, at Philadelphia during that long hot spring and summer of 1787 in Philadelphia, where the Convention was underway.

He delineated the various stresses and strains within and without the thirteen states and why their centers of gravity varied, some having closer ties to foreign governments than to the Confederation. The attempt to save the Confederation by strengthening it faltered again and again. The Virginia Plan and the New Jersey Plan were so far apart that compromise appeared unattainable.

We both then recalled the words of Chairman of the Convention, George Washington:

"It is too probable that no plan we propose will be adopted. Perhaps another dreadful conflict is to be sustained. If, to please the people, we offer what we ourselves disapprove, how can we afterward defend our work? Let us raise a standard to which the wise and the honest can repair; the event is in the hand of God."

The same situation, the President said, could very well prevail at a United Nations Charter Revision conference. But the lesson of 1787 was that intelligence, the ability to give a little, and the over-riding requirements for survival

can prevail over sovereign or narrow-minded interests. It was the ability and willingness to compromise for the sake of the larger interest which had created the Constitution and the strongest democracy in the world. This could work on a world level.

And the President added forcefully, the ability and willingness to compromise might, in the end, serve to create a world constitution, the provisions of which would enable the world's people to live without the fear of war ever happening again.

He had a proposal to make before I left. Why, the President asked, why can't we say that the entire program for one year (of the United Nations Association) will be to make the United Nations a more effective instrument for peace?

I knew what he had in mind. It wasn't necessary to ask him to spell out the details. For if Dwight D. Eisenhower thinks the United Nations Association and all its members can and should mount such a one-year program, there are plenty of brains around to work out the details.

I stood to leave. My time had been up a long while ago. The President got up from his desk and walked into the middle of the room to say a last word. He was, he maintained, essentially an optimist. He had always been one and would remain so. He was still hopeful that man's intelligence would outwit his inventiveness.

[From Life Magazine of Sept. 29, 1967]

Interview With Secretary of Defense McNamara

Q. *Early this year, in testimony before a House committee, Mr. Secretary, you said, " . . . the Chinese threat, in itself, would not dictate the [U.S.] production of an ABM system at this time," Can you tell me why that statement is no longer valid?*

A. The lead time then, as I pointed out, was longer for the Chinese than it was for us. It would take them longer to put in their offensive system—their ICBMs—than it would take us to put in our defensive system.

Since then nine months have passed and we are now at a point where, in a sense, our lead times are in conjunction, one with the other. It is appropriate, therefore, that if we are going to go ahead, we do so now.

Q. *Is there any reason to believe that in the past nine months their pace in developing an ICBM system has been accelerated?*

A. No, no. Their pace is almost exactly as we predicted at that time. They could have a first-test shot of an ICBM booster before the end of this year. If they do, they could have a small but militarily significant force of ICBM's in the mid-'70s. It is against that schedule that we have had to make our decision.

Q. *When do you estimate China will have a "second strike capability" [the ability to absorb a nuclear attack and still have enough bombers and missiles to inflict unacceptable damage on the attacking country]?*

A. It is very difficult to predict. I would say, not for 15 to 20 years.

Q. *And hopefully, before that time, some kind of international agreement will be drafted?*

A. Well, I don't want to anticipate what China might or might not agree to in 15 or 20 years.

Q. *In your speech you also spoke of "conceivable conditions" under which China might "miscalculate" and attempt a nuclear attack on the U.S. Could you expand on that?*

A. We can visualize a situation of tension between Red China and the U.S., brought about by some aggressive move by the Chinese. In that atmosphere, it is conceivable that someone in their government would predict that the U.S. was going to launch nuclear weapons to destroy their small and highly vulnerable missile force on the ground. Under those circumstances, some in China might be tempted to recommend that they pre-empt—that they launch ahead of time, because otherwise they would not be able to launch at all.

That kind of attack should be deterred by this system, and in any case we would be protected against it.

Our ABM has a second purpose, too, involving our friends in Asia. There has been lingering doubt in some Asian countries that if China in a few years were able to reach the U.S. with an ICBM, we would be deterred from taking actions that might risk a Chinese attack. Our decision to deploy a light ABM system ought to remove this doubt. Not only would it be utter suicide for Peking actually to attack the U.S. or our allies, but China would not be in a position to claim that we would back down because we feared civilian casualties at home.

Q. *Now, if such an attack did occur in the late 1970's, what degree of success would it have?*

A. Well, it would depend upon the number of weapons they have at the time. It is conceivable that, undefended, our fatalities would be between five and 10 million; and with the kind of defense that we will put in, the fatalities would range from almost zero to something less than a million.

Q. *Is there any concern that Russia would provide China with penetration devices and other sophisticated equipment designed to get around our missile defenses?*

A. Very unlikely. The Soviets are quite concerned with the Chinese, themselves.

Q. *China's missiles can be turned around?*

A. That's right. They can go in both directions.

Q. *The obvious question, Mr. Secretary, is: Why are we defending our cities against a possible Chinese attack and only our missiles against a possible Soviet attack?*

A. Our decision was based on their quite different technological and economic capabilities.

We can put up an anti-missle defense of our cities against China that will be effective and remain effective for many years to come. We can't against the Soviet Union, because they have already advanded so far in the development of the size and sophistication of their offensive force and are capable of still further advances.

Every ABM system that is now feasible involves firing defensive missiles at incoming warheads. It can be defeated by a sophisticated opponent with a large economy—like the Soviet Union—who can afford to launch more warheads and decoys than the defensive system can handle. The Soviets could equip themselves to overcome any system we could now deploy.

The Soviets not only have the capability, but strong motivation, too. Their leaders are determined to maintain their own ability to deter the launching of an American attack by having the capability to destroy our society in retaliation. If we deployed a defense that could, if the Soviets did not react, greatly reduce our expected casualties, the Soviets could and would respond by increasing the size of their offensive forces—just as we have done in response to their system. In the end we would be no more secure. That's why it doesn't make sense for us to waste resources in a futile effort to defend our cities against a Soviet attack.

Q. *Can you tell me a little about our projected "light" ABM system?*

A. The system has four major components—two types of radar and two types of missiles. It is designed to provide two kinds of defense: first, a so-called "area" defense of the entire U.S. population against the kind of small attack the Chinese might be capable of in the mid-1970s, and second, a "terminal" defense against Soviet attack on our underground Minuteman intercontinental ballistic missiles. In addition, our ABM also will protect us against a nuclear armed missile launched accidentally by any one of the nuclear powers.

Q. *How does the area defense work?*

A. A special, highly sophisticated kind of radar, called Perimeter Acquisition Radar [PAR], detects ballistic missiles at long ranges, tracks the incoming warheads and predicts their paths. Then a missile called the Spartan is fired to intercept and destroy the warhead well above the atmosphere, with no fallout hazard. That intercept point can be hundreds of miles from the Spartan battery location.

One installation will be able to protect a very large area of land around it. For that reason, only a few sites are necessary to cover the entire country. All the population within that area is protected.

Q. *What about the so-called terminal defense?*

A. It is very different; it is a defense of a point rather than an area. We now plan such a defense only for the ABM radar and the Minuteman missile silos, so that our second strike capability will survive. In case of an attack by the Soviets, we have to face the possibility that there will be enormous "clouds" coming at us—tens of miles across and perhaps as many as hundreds of miles long—composed of a variety of objects which will prevent our radar from seeing in detail which objects in there might be warheads.

Q. *When you say "clouds" do you mean some war-heads, some decoys—things of that nature to confuse the radar?*

A. Yes. Chaff, pieces of metal, boosters, everything. This stuff, however, gets separated out as it impinges on the atmosphere during descent. Atmosphere slows down particularly all the light objects. Heavy things bore through. So, when the actual enemy missiles are below a few hundred thousand feet, the terminal defense system can intercept them with individual missiles. If they are headed toward a Minuteman site or a radar installation, they can be taken under fire by Sprint, the short-range interceptor designed to destroy incoming missiles within the atmosphere. The danger to the population below is negligible.

We expect to have to attack each warhead separately. The enemy would not likely be so foolish as to place his re-entry objects so close together that we could annihilate them all with a single missile.

Q. *Can we adequately test an ABM system in view of the ban on atmospheric nuclear testing?*

A. Yes. The primary problems are not in the warheads, which can be satisfactorily tested underground, but in the coordination of all elements of the complex system. We are building sites in Kwajalein for that purpose.

Q. *Could the country which builds an ABM now conceivably come up with a technological breakthrough that would significantly improve its effectiveness?*

A. I think the reverse is more likely the case—that as you proceed in production, the project becomes so immense that there would be a great tendency and temptation to reduce your efforts to advance technology. I, myself, am certain

that, had we gone ahead with Nike-Zeus in 1961 or 1962, it would have been an incorrect decision. We would now have a system that was obsolete before it was actually deployed. But also, in the interim, it would have taken away the emphasis we have put on research, development and advancing technology, which has led to the system we are deploying today.

So, it will be difficult to maintain the emphasis upon new developments while we are undertaking the ABM production program. We will plan to do so, however. We are spending about a half billion dollars a year in research on ABM systems today and plan to continue to spend that in the future.

Q. In your speech, you warned that this Administration and the succeeding ones will have to resist pressure to expand the present system. From whom will pressure come?

A. It will come from some private citizens who don't understand how futile an attempt to get an effective defense against the Soviets would be, from some members of Congress, from some of the military and from some in industry.

Q. Does the U.S. possess nuclear superiority over the Soviet Union?

A. Yes, we do, but I believe the notion of "nuclear superiority" has only limited relevance today. People become mesmerized by the word "superiority"; if you are superior, presumably you have some advantage you can translate to your own interest. But the advantage is certainly not what the words "superior military forces" connoted in the past.

A nation with an army of one million men used to have a significant military edge over a neighbor with an army of half a million. And under most circumstances, this military superiority could be translated into effective diplomatic leverage and political power. But today, in the nuclear age, nuclear superiority is of limited significance: despite our current superiority, or any realistically attainable superiority, the Soviet Union could still destroy the U.S. even after absorbing the full weight of an American first strike.

The U.S. and the Soviet Union can mutually destroy each other, regardless of who strikes first. And this fact narrows the range of Soviet aggression which can be effectively deterred by our nuclear forces. Even with our nuclear monopoly in the early postwar years, we could not deter the Soviet pressures against Berlin or their support of aggression in Korea. Today, they do not deter Soviet support of aggression in Southeast Asia.

What all of this has meant, of course, is that we—and our allies as well—have required substantial non-nuclear military forces to cope with the kinds of aggression upon which massive strategic forces have little effect.

Q. *While maintaining our nuclear superiority, right?*

A. Oh, yes, and we will maintain it. Today our total forces can deliver 3 to 4 times as many warheads on the Soviet Union as they can deliver on us. We can also deliver more megatons, although the superiority there isn't nearly so great. We have about 4,000 separately targetable warheads—bombs and missile warheads—in our strategic offensive forces opposing the Soviet Union. They have roughly 1,000 which they could target against us.

We think that "separately targetable warheads" is the best single measure of the relative strength of the forces, rather than the number of launch vehicles or bombers, or megatons. We are in great danger of becoming obsessed with megatonnage as a measure of strategic force capability. It is the wrong measure. The number of targets each side can destroy is the important thing, not the total megatons each side can deliver.

Most targets can be destroyed by a megaton. That's equivalent to a million tons of TNT, 50 times as much as the weapon that destroyed Hiroshima. In fact, most targets can be destroyed by a much smaller weapon. Against such targets, a 20-megaton weapon is not more effective than a one-megaton weapon. If the target is destroyed, it's destroyed. Even for targets particularly suited to large weapons, such as very big cities, the destructive work of one 20-megaton weapon can be done by 4 or 5 one-megaton weapons. So, adding up megatons gives you the wrong answer.

Q. *Some people disagree. They speak of a "megatonnage gap." How do the Russians feel about megatonnage? A few years ago the Russians tested a 50-megaton weapon. . . .*

A. Yes, the Soviets have apparently gone for fewer and larger warheads. But we've bought more, smaller warheads—large and accurate enough to destroy their targets. And we're planning another big increase in the number our forces can deliver. We're doing it to be sure we can overcome the most powerful defenses the Soviets could build.

Q. *Does this mean that we will have to greatly increase the number of boosters in our strategic missile forces?*

A. No. We are replacing existing missiles with far more powerful ones—replacing Minuteman I and II with Minuteman III, and Polaris with Poseidon. More important, we're capitalizing on a major new technological advance. We can now equip our boosters with many warheads, each of which can be aimed at a separate target. We call this MIRV—Multiple Independent Re-entry Vehicles.

Q. *Does the public know about MIRV?*

A. There have been allusions to it in the press, but it has not been described publicly. We're buying MIRVs for both Minuteman and Poseidon. We believe that we have a substantial lead over the Soviets in this important technology. Through the use of MIRVs, we will redesign our strategic force to increase the total number of warheads. This will do two things: exhaust their defenses and at the same time better match the size of weapons to the targets to be destroyed. The net result will be an increase in military effectiveness with some reduction in the total megatons in our force.

Q. *A reduction in megatons?*

A. Yes. This reduction is like the one that President Eisenhower initiated in 1959 and 1960. Acting on the unanimous recommendations of the Joint Chiefs of Staff, he approved replacing the very large MK–36 nuclear bombs with larger numbers of the light, compact weapons that our bomber force now carries. Even though it reduced the megatonnage of the total stockpile by 40%, President Eisenhower was absolutely right to do so. President Kennedy carried out that decision.

Q. *To what degree does MIRV complicate the job of a missile defense system?*

A. Considerably. It's one of the things that makes us so confident that we can overcome the Soviet ABM. But in a few years the Soviets could have their own MIRV's and that is one of the reasons we are pessimistic about deploying an effective, more extensive ABM against them. Both our missile defense system and theirs were designed before MIRV's came along as a serious possibility. The optimistic statements made by ABM proponents on both sides haven't taken such things as MIRV's fully into account.

Q. *We have proposed talks with the Russians on the limitation of ABM defense systems. Are you at all hopeful that some agreement can be reached?*

A. We have tried on a number of occasions since last November to initiate discussions with the Russians. President Johnson spoke to Chairman Kosygin about it at Glassboro, as did I. The President is very anxious to engage in such discussions. We believe it is possible, either informally or formally, to agree with the Soviets on some form of limitations that would apply to both strategic offensive and strategic defensive weapons, to our mutual advantage. Early this month we tried again to initiate such discussions. We continue to hope that talks will be undertaken. In any event, the action we are taking now to deploy a system that has as its primary purpose the protection of our people against the Chinese threat would not be influenced by such discussions.

Q. *Are we making clear to the Russians, both privately and publicly, that this is a system not aimed at them?*

A. It is obvious from the technical design of the system. There will not be any misunderstanding by the Russians because they are sophisticated enough to see, in the deployment plans that will be made public, the distinction between Chinese-oriented and Soviet-oriented population protection systems. It is very important that our own people do not misunderstand that point.

Q. *Do we expect the Soviet ABM system to be expanded from the present modest system they are now deploying?*

A. Well, first there is some uncertainty as to the character of that system. We know that they are building one around Moscow which is not yet operational. They are deploying a second system elsewhere which may have an ABM capability. But the evidence is not conclusive. As Secretary of Defense I must assume that they will deploy a system across their entire nation, and that is the assumption on which we are developing and have developed our offensive weapons. Whether they will do that or not, I do not know.

Q. *Is our "light" ABM system more modest than theirs?*

A. Well, I think it is for a different purpose. Their Moscow system appears to be directed toward protecting Moscow against a potential U.S. attack. It is going to be ineffective for that. All of our senior commanders and all of our civilian officials in the Defense Department are very certain on that point. Ineffective

because it is a very primitive system, which our existing weapons can overcome. Even if they later bought a better defense of Moscow, we would be able to overcome that too.

They undoubtedly made the decision to produce and deploy the Moscow system back in 1961 or 1962—when we, too, were considering deployment of a similar system; when many in our nation advocated deploying such a system. Had we followed that advise then, it would have been a serious error. Such a system would not be any more effective against the Soviets than their Moscow system will be effective against us.

Q. *Why, if the Russians know that any ABM system in ineffective—and I think their generals have admitted this—why does Russia persist in spending billions of dollars on it?*

A. You are quite correct. Some of their generals have admitted that their ABM system is ineffective. They have done that very recently, within the last six months. But they probably are not the same generals who made the decision several years ago to deploy it. The generals who made that decision are similar to some Americans, both civilian and military, who back in 1959, 1960, 1961, were strongly urging that we go ahead with what was then known as the Nike-Zeus, which would have been similar to the present Moscow system.

So, I think what the Soviets did then was to follow the same kind of advice we were getting, but which we decided against. And now some of their generals admit it was wrong.

But decisions like these have a way of acquiring a momentum of their own. And the Soviets have, for a decade and a half, spent far more on strategic air defense than we have, with little to show for it. There never has been any question that we could get through with bombers or missiles. So, the Soviets have wasted those expenditures on defense to a very substantial degree.

Q. *The momentum you speak of—I would think that might be more of a danger in an open society like ours, a demand that we expand our ABM. How are this and succeeding administrations going to control that?*

A. Well, we controlled it on the Nike-Zeus. We did not build it. We controlled it on the B–70. We didn't build it. The Hercules and the Hawk missile programs were controlled. I think we can control the ABM. We really control the momentum by informing our public of the pros and cons. And that was the reason for my 25-page speech in San Francisco. That is the reason I am sitting down here with you this morning.

Q. *You touched upon the theme of common interests with the Soviet Union. What are they?*

A. I do not want to exaggerate this theme because in many, many respects the Soviets are following an aggressive foreign policy that is contrary to the interests of the free nations of the world. I am not under any illusions as to that policy.

But the fact that we are in conflict in some spheres does not mean that there are not some areas in which our interests coincide. One of them is in avoiding a continuing escalation in strategic offensive and defensive weapons. We can each achieve the deterrent we need without that continuing escalation. It is unlikely that either one of us can achieve a meaningful advantage over the other.

The fact that there are within our society other desirable uses of the resources we devote to military hardware is so self-evident that it hardly needs elaboration. The same is true, to perhaps an even greater degree, in the Soviet Union. Just as important, both we and the Russians should be devoting much more of our national wealth toward improving conditions of life within the less-developed countries.

Q. *Besides a limit on arms expenditures, do you see other areas of mutual interest between the U.S. and the Communists?*

A. Avoiding nuclear war, of course. Trade is another, I think. Look at the failure of Congress to support the Administration's program of building bridges of trade with the Eastern European nations. Its actions included the denial of the Administration's request to participate in the $50 million loan to the Fiat Corporation to help the Soviets expand their automotive industry. This would be like putting them on dope. Once they get an automobile industry, they will never get off it. And that simply means they divert resources away from defense to consumer goods. How could that possibly be contrary to our interests? We are misguided if we fail to recognize these potential areas of common interest, as distinguished from their basic, aggressive foreign policy.

Q. *The U.S. and the Soviet Union are trying to agree on a draft for a nonproliferation treaty which would commit us to seeking an end to the nuclear arms race. Isn't our ABM deployment a step in the opposite direction?*

A. One of the assumptions inherent in negotiation of the nonproliferation treaty is that the real deterrent to China's use of nuclear weapons is the overwhelming offensive nuclear capability of the U.S. We have emphasized this in our many conversations about the treaty with our friends in Asia.

China's leaders know that an attempt to attack the U.S. would invite the utter devastation of urban China. Our allies know that the same constraints that prevent China from attacking the U.S. prevent China from attacking them. At the time of the first Chinese nuclear test in October 1964, President Johnson said nations that do not seek national nuclear weapons can be sure that, if they need our strong support against some threat of nuclear blackmail, then they will have it. The capability to neutralize whatever nuclear threat China will be able to direct at the U.S. underscores our pledge of strong support against nuclear blackmail.

We firmly believe that it would serve no useful purpose for nations in Asia to acquire nuclear weapons of their own with all the financial burden, diversion of resources and needless competition that would entail.

Q. *In other words, those nations which depend on us for defense should be cheered by our announcement, because it assures that we will not be devastated by a Chinese attack?*

A. That is correct. Furthermore, it is extremely important that this ABM action of ours not be misunderstood in relation to our commitment to seek an end to the nuclear arms race.

I do not believe that a very limited ABM deployment is a step-up in the strategic arms race between the U.S. and the Soviet Union. Our deployment isn't designed to protect the cities of America against a Soviet strategic attack, and thus it in no way threatens the Soviet ability to deter an American attack.

The fact is, however, that they have been building up their strategic missile forces. We had no choice but to take some additional steps to maintain the adequacy of our own deterrent.

We considered a number of alternatives—adding more missiles, a new manned bomber, or even a new strategic missile system. We reached the conclusion that one of the most effective steps we could take, and the one least likely to force the Soviets into a counter-reaction, was the deployment of an ABM system which would protect our Minuteman sites, so that our own deterrent is not diminished.

Our ABM defense shouldn't have any adverse effect on negotiations of the nonproliferation treaty. Indeed, the arguments for signing such a treaty are more cogent than ever.

MEET THE PRESS TEXT FROM MARCH 9, 1969

Guests:

Dr. Jerome B. Wiesner, Provost, M.I.T.

Dr. Abram Chayes, Professor, Harvard Law School.

Moderator: Edwin Newman, NBC News.

Panel:

William Beecher, New York Times.

Peter Lisagor, Chicago Daily News.

Robert Goralski, NBC News.

Lawrence E. Spivak.

Mr. NEWMAN. Our guest today on Meet the Press is Professor Jerome B. Wiesner of M.I.T., and Professor Abram Chayes of Harvard, who are directing a study of the ABM problems for Senator Edward Kennedy.

The question of whether the United States should construct and deploy an antiballistic missile system has become a major controversy. Professor Wiesner served as Science Advisor to Presidents Kennedy and Johnson and is now Provost of M.I.T.

Professor Chayes is formerly legal advisor to the Department of State; is a professor at the Harvard Law School.

Mr. SPIVAK. Professor Wiesner, you have advanced many reasons for your opposition to deploying the Sentinel ABM system. If you had to select one most important reason, what do you consider the most compelling reason for your opposition?

Dr. WIESNER. Well, in my judgment it won't work. It won't provide the defense that people claim it will.

Mr. SPIVAK. Now, you recently said, "I think the Sentinel is totally useless. Most of the experts generally admit that now."

Now, if most of the experts now admit that, why do you think President Nixon is even giving consideration to deploying an ABM?

Dr. WIESNER. Well, when I say most of the experts, I am talking about most of the experts who are not part of the bureaucratic machinery that has been responsible for the evolution of this and still tends to support it. I think the professionals within the Defense Department and many of them inside the industrial companies that are working on it would not agree, but what I meant was all of the dispassionate observers on the outside which say this and I think even many of the people who work for the defense industry and work within the Pentagon would say that the Sentinel in its present form will provide very little defense. Many people are hoping that the Sentinel is the beginning of a much larger deployment of an antiballistic missile system and regard this first phase as a transient phase.

I think you should remember that when it was first proposed a few years ago it was a $3.4 billion system which people would say will do what the present $10 billion system is reputed to be capable of doing. We said then we didn't think it would and to fix up some of the worst defects it was moved up to a $5 or $6 billion program and even then it had some glaring deficiencies and now we are being told that it will be about $10 billion and I think it will have similar problems, even so.

Mr. SPIVAK. Professor Chayes, unlike Professor Wiesner you are not a scientist. On what do you base your major objection to the deployment of the ABM?

Dr. CHAYES. Well, of course I start with the reliability problem that Professor Wiesner has just mentioned because I suppose nobody would oppose the deployment of a defense that would really give us defense. So you have to start with the point that Dr. Wiesner has made that the scientific and technical community at least outside the government is almost unanimous in its skepticism about whether the system will produce as advertised.

But, taking that at least very dubious reliability from the experts, for me, the important reason here is that we are at a moment of opportunity, a potential turning point when it might be possible really to make some progress on turning down the arms race.

Why are we at that kind of a momemt of opportuntity? Well, it seems to me there are three important reasons. First, both sides, the United States and the USSR, have what President Nixon has called a sufficiency in the strategic weapons field. That means both sides know that they can retaliate in the case of a first-strike attack and neither of them is worried about getting frozen into a disadvantage in an arms control negotiation.

The second point is that the Russians want to talk and the third is that we have a new Administration that it not bound by the commitments and decisions of the past.

All that adds up to a moment of opportunity for real progress. Those moments are very rare. If they are lost, they don't come again very soon, and that is my principal reason for not wanting to disturb the situation right now.

Mr. BEECHER. Professor Wiesner, in a paper recently published by the Center for Democratic Institutions, you stated that a thin missile defense might be very valuable in a disarmament situation to protect against weapons that the other side might build if it cheated.

Why then do you oppose construction of such a system as we approach disarmament talks?

Dr. WIESNER. Because I don't believe that we have achieved a situation that would justify doing that. I think a situation that would justify building a defensive system to support a disarmament program is many years down the road and I don't believe that it is worth making that investment for that purpose right now.

I must say I have, from time to time, asked myself privately whether I should be devious enough to support an ABM in order to be able to argue that it improved the atmosphere for disarmanent, but I don't believe that it is true. It is only after you have really gotten rid of most of your strategic weapons or all of your strategic weapons that you would need this kind of defense to protect yourselves against an occasional clandestine weapon.

I think one can go very far in the elimination of nuclear weapons before you would need this form of protection.

Mr. BEECHER. Since a thin missile defense could be overwhelmed by either the Chinese or the Russians—by the Russians or the United States in an all-out attack, why would construction of such a system upset the balance of power or lead necessarily to an upward spiral in the arms race?

Dr. WIESNER. Well, I don't believe that the proposed thin system would protect one against a sensible small Chinese force either, any more than, as I said earlier, the $3 million proposed system of a few years ago would. So I would think one would have to go on adding to it as one became more and more realistic about a Chinese threat and pretty soon it would become something that would be quite formidable for a Russian attack too and upset the balance that Mr. Chayes was talking about.

Mr. LISAGOR. Professor Chayes, in your answer to Mr. Spivak a moment ago, in speaking of a moment of opportunity with the Russians, there was implied the notion that if we go ahead and deploy the ABM we will somehow discourage the Russians from talking.

Now, most people or many people, including Secretary of Defense Laird, believes that it will be a bargaining tool. What evidence do you have that the Russians—we might lose this opportunity if we deploy?

Dr. CHAYES. Well, I think the Director of Disarmament, Mr. Girard Smith, said the other day before the Congress that he didn't think the decision to go ahead with the ABM would discourage the Russians from coming to the table, and I don't think there is much doubt about that if you put it in that negative a way.

On the other hand, the problem of getting an agreement is a much more difficult problem than just getting to the table. When you get this kind of action-reaction pattern that Dr. Wiesner has just talked about, the situation that I just talked about where there is a balance, that both sides feel they can accept, is lost, and then it gets hard to write the agreement.

Now, I have heard about Secretary Laird's statement that we need a $5 billion poker chip to go into the talks with.

Mr. LISAGOR. $10 billion.

Dr. WIESNER. And it is now $10 billion since he made the statement two weeks ago, but I don't see that we have to deploy this system or begin to deploy it to have the value of that as a potential option in the bargain with the Russians.

Mr. LISAGOR. Professor Chayes, there have been many questionable weapons programs. There have been many that have been obsolete before deployed;

there have been those that proved unworkable. In the H-bomb there was a great argument among the scientists over the efficacy of developing a hydrogen bomb. Why now are you gentlemen so arrayed against this ABM Sentinel system?

Dr. CHAYES. Arrayed is probably a stronger word than I would use. We are opposed to it. I think the important thing to be said about it, Mr. Lisagor, about this, is that we will welcome this debate. It has been too long in our history that decisions of this kind, decisions on multibillion dollar defense programs have been made by professional military men without review by public debate and without proper review by Congress.

Now, these programs cost billions of dollars. As you said, we made mistakes before. I know the Generals in the Pentagon are trying to do their job just like everybody else, but they are no more infallible about these matters than let's say the head of the OEO is about his programs. It is important that these matters get out into the public, get debated, and that a decision is made by the responsible democratic processes. And I think in this sense the ABM is another moment of opportunity because it is a time in which we have gotten public interest in this kind of a debate about basic weapons policies.

Mr. GORALSKI. Professor Chayes mentioned just a minute ago the Pentagon Generals in terms of thinking, and I would like to direct this question to you if I may, Professor Wiesner, that if you were in charge of Pentagon planning, wouldn't you be concerned about the Soviet anti-ballistic missiles going up around Moscow and the very real possibility of a deployment of an orbiting satellite by the Russians in the near future?

Dr. WIESNER. I would certainly be concerned in the sense that I would watch them, but knowing what I know about them, which is what I believe everybody in the Pentagon knows, I would not be concerned about them as a serious problem for our own offensive forces. We live in this world and we all know about what we call a balance of terror. The Soviet's ability if need be to attack us and our ability to attack them. And the question one needs to ask is not if the Soviets build an ABM should we build an ABM. There seems to be this mistaken notion that we have to maintain this kind of symmetry. The real question is does it affect our strategic deterrent. So one should really be addressing this question to the Generals in charge of the deterrent force: Do you feel that this threatens your ability to do a job you are supposed to do? And I think they would say No.

The thing that has gone up around Moscow and which apparently they have quit working on is what most of us would regard as a very obsolete system. It is my opinion it was put in at the time the Soviets probably believed—the decisions were made when they probably believed we were going to deploy Nike-Zeus, and they didn't want to be in the position of having the Soviet citizens and the Soviet Generals and the Politburo members saying "The Americans have an anti-ballistic system and we don't have one," and I think theirs was a response to our earlier decision. I don't believe it is a threat to our security.

Mr. GORALSKI. Isn't the argument on the wrong foot, then, Mr. Wiesner? Shouldn't we be talking about knocking down offensive weapons, not defensive weapons which actually don't hurt anyone?

Dr. WIESNER. Well, we should talk about both. Right at the moment we have an opportunity to avoid making another mistake, a multi-billion dollar mistake, which starts with a $10 billion budget, and which if followed and allowed to run the way these things normally run, will cost the country I don't know—fifty, sixty, a hundred billion dollars over the next decade, and why shouldn't we stop that as well as pursue, as Professor Chayes has said, an opportunity to cut down our offensive power, which I believe we should do.

Mr. SPIVAK. Professor Chayes, you testified before a Congressional Committee recently, and I think you questioned the reliability of the ABM system, as you did suggest here today. Well, now, if the system isn't reliable, don't you think the Russians know that? Why then if they know that, would they increase their offensive capability to counter it?

Dr. CHAYES. Again I think you have to watch the way both of our military agencies operate in these circumstances. When we deploy a system, the Russians have to react conservatively. That is, they have to assume that the system will do a lot more than we think it will do, because they can't take the lower half of that option and so they have to be sure that they can penetrate that system even if it performs up to expectations.

That means they must increase their offensive capability in order to penetrate the system. To put the problem the other way around, that is exactly what we have done already with respect to this very small, very obsolete system around Moscow.

We have put in a new generation of offensive missiles in both our Minuteman III and our Poseidon which is designed to increase our offensive capability in order to make absolutely sure we can penetrate a system that we think is already obsolete.

Mr. SPIVAK. Professor, granted that disarmament is better than either more offensive or defensive weapons, which do you prefer, if disarmament cannot be achieved? I mean in what direction should we go?

Professor Chayes, first.

Dr. CHAYES. Well, I think again Dr. Wiesner has put the problem in the appropriate focus. We have to make sure that our deterrent is effective. That is what we have relied on for the last 15 years against the Russians. It has kept us at peace. We have got to make sure that under any circumstances our retaliatory capacity is sufficient to inflict unacceptable damage on the Ru. sians.

Now, I think we have got that over and over and over again now. We have got a thousand ICBMs, we have got 400 POLARIS missiles; we have got I don't know how many thousands of SAC bombers and advanced missiles in Europe. There simply isn't any way at the moment where that retailiatory capacity can be threatened.

Now, obviously we have got to go forward with research and weapons development and intelligence, but until we find our retaliatory capacity threatened, it seems to me we don't face dangers of the kind that would warrant deployment of this kind.

Dr. WIESNER. This is a rhetorical question anyway. You say would you rather have offense or defense. If we could have an effective offense, I would be for it, but I don't think we can. I don't believe this sytem will ever function for the reasons people claim it will for a whole variety of technical reasons which I could go into if you had the time, but you probably don't want to at this stage.

Mr. LISAGOR. Dr. Wiesner, I would like to ask you about this very point. You have said it won't work. You have called it a $10 billion mistake and yet in a seminar last November, in discussing the assumptions on which you base your conclusions, you say the assumptions are essentially undefinable. "We are talking about things we do not know and cannot know anything about, no matter how we try." Why this certitude then about the workability of this if we don't really know what we are talking about?

Dr. WIESNER. Well, we can talk about the technical aspects of the system. When I made that statement, what I was talking about was the fact that we cannot predict what the nature of the Chinese attack will be, what the kind of—what kind of decoys they will use, whether they will choose in fact even to use a conventional ICBM and not use something quite innovative which would bypass the defensive system entirely.

The things that we can say, as based on our experience with other defensive systems—somebody earlier, Mr. Goralski, raised the question of these large systems which have never worked as expected. It has generally taken us twice as long and a good deal more money to develop systems than we thought it would and then turn out to be considerably less effective even when they are finished than we had estimated they would in the beginning. An offensive system that is thirty percent effective may still be an awesome thing, but a defensive system that is fifty percent effective is not very much good.

Mr. LISAGOR. In the light of your previous government experience and especially on the Nike-Zeus, which was abandoned, can you tell us what you think is the pressure of industry and Congressmen who have jobs in districts, upon such a thing as a deployment of the ABM?

Dr. WIESNER. Well, in the case of the Nike-Zeus, I can talk. I don't know about the present situation because I haven't been in the government, but President Kennedy was certainly under very great pressure from people in the Congress and from people in industry to make an affirmative decision in the case of Nike-Zeus, a decision which obviously now everyone admits would have been very wrong.

Mr. BEECHER. Professor Chayes, are we safe to assume that the Russian fail safe system is so good that a group of fanatic Soviet colonels couldn't tomorrow launch three ICBMs that would destroy Chicago, New York and Boston?

Dr. CHAYES. Well, that raises the question of the accidental launch, as one of the contingencies that this system has been said to be able to protect against.

Incidentally, I might mention that this adjustable justification that comes out of the Defense Department, is one of the things that ought to raise suspicions about the programs as a whole. If you knock down one reason for the deploy-

ment, they come up with another and if you knock down that one, they come up with another and pretty soon you begin to think that the real reason for the deployment is that somebody wants to deploy it.

But, to get back to the accidental launch, in the first place, you are talking about a very, very remote contingency as you must recognize, and the question is what are you going to pay for protection against that contingency, not only in terms of money, but in terms of lost opportunities, as I have suggested.

And, secondly, the question is whether a system that, as my friend, Dr. Wiesner said, probably wouldn't be very reliable even if tuned up and on the alert, is going to be available some Sunday morning when these three litte missilles come over, to respond properly in an accidental situation.

Mr. BEECHER. If our own fail safe system somehow broke down and we launched three missiles against Moscow, would their system now of 60 to 70 antimissile missiles knock down the American missiles?

Dr. CHAYES. You better ask Dr. Wiesner about that.

Mr BEECHER. Dr. Wiesner?

Dr. WIESNER. Well, first of all, I suppose it is a question of where these were launched to. For example, if these are accidental—you say it is a breakdown of the fail safe system; then I suppose there is only a very small probability that the missiles that were launched would even go to Moscow because we must have targets all over the Soviet Union. So that is the first thing.

Second, I don't know enough about the Soviet system to know whether or not it has an alert that would permit it to do that. My own judgment is that it would be very easy to deliberately overpower the Soviet system, whether or not it would respond to this kind of an attack or this kind of an accident, I don't know. My own judgment, based on my knowledge of these systems, is that it probably wouldn't, but I don't have any detailed knowledge of the Soviet system or how much they are willing to pay for that kind of alert. If you are willing to work very, very hard and design the system so that its responsiveness is primarily for that purpose, you might achieve some capability, but it would be a specially designed arrangement.

Mr. NEWMAN. Less than three minutes, gentlemen.

Mr. Spivak.

Mr. SPIVAK. Dr. Wiesner, what puzzles me about this controversy is why there is such a sharp difference of opinion among scientists on a technical issue, a question of its effectiveness. How do you explain this?

Dr. WIESNER. Well, it is not really a technical issue in the sense that we can talk very clearly about the technical components and I think all the proponents and all the opponents would agree about the functioning of the radar and the functioning of the computer and the functioning of the Sprint missiles in a situation where it wasn't all put together and made to respond rapidly.

What our judgments differ on is how long it will take to make this system perform like a paper analysis says it will; whether it can be maintained in that state of readiness even after it has been brought to that state of perfection and whether it can respond fast enough to the unknown and changing threat situation.

Mr. SPIVAK. But recently Dr. Bethe, Dr. Ruina and Dr. Fink, three well-known scientists, agreed that some protection of bases might be needed against Soviet missiles. Now, why don't you go along with them?

Dr. WIESNER. Well, if you read that testimony—I would agree with what Ruina and Bethe said and not with what Fink said in the following sense: this is a question of whether the latest argument for deploying, the latest use which is different from protecting the population of the United States, isn't a valid one. That is, shouldn't we deploy this around our Minuteman missile bases so as to protect them if the Soviet Union was to attack the Minuteman bases. Bethe and Ruina and Fink all agreed that you could get some protection, and I agree, too.

Now the difference here is that you have got a thousand Minutemen and they are attacked by a thousand Russian missiles, or somebody else's missiles—I don't think this will very likely happen—that even if you save 200 of the Minutemen, you have done something quite useful. Whereas if 80 percent of your country is destroyed, you haven't done anything very useful. I mean this is the main difference. The objective is very different.

But finally, we don't need it, which is the important point. We don't need to protect the Minutemen at this time.

Mr. NEWMAN. I am sorry to interrupt, gentlemen, our time is up. Thank you for being with us today on Meet the Press.

[From the New York Times, Mar. 22, 1969]

On Farm in Dakota, Missile is Something to Plow Around

Grand Forks, N. D., March 19—A part of the massive nuclear retaliatory capacity of the United States is buried out on Merlin Fingarson's farm, 60 miles northeast of here.

The pancake-flat valley country of the Red River of the north, gives way to gently rolling land near Edinburg, N.D., and Mr Fingarson's farm is nearby.

A half mile down the road from his house, a 70-foot Minuteman missile is buried in a steel and concrete silo. It is on a half-acre plot, surrounded by a 10-foot chain-link fence topped with barbed wire.

There is some talk in Edinburg that Mr. Fingarson has become "a little uppity" since he got his missile, but he is warm and cordial to visitors and says he sleeps well at night with his nuclear neighbor.

Like most of the scattered farmers in North Dakota, he knows there are more missiles coming—the antiballistic missile system to guard the Minuteman. But unlike suburbanites around America's major cities who raised angry protests over the possible location of missiles near their homes. Mr Fingarson is not worried.

His Minuteman has become just another part of the landscape.

There is little to be seen inside the chained and padlocked enclosure numbered C-21.

There are two hospital-four gray electronics sensors green square (sic) ventilator hoods, looking like a ships' ventilator stacks, staring blankly at each other across a snowswept, 80-ton concrete lid.

Four telephone poles, topped with lights and a yellow concrete cylinder that Mr. Fingarson thinks is an aiming post, are also there.

A sign outside the enclosure warns, "Keep Away from Underground Antenna."

Mr. Fingarson, thin and 49 years old, has three sons and a daughter. He farms 560 acres, mostly in wheat, and has 14 head of beef cattle. His net income last year was $2,500, and his wife works part time as a nurse.

Standing in his linoleum-floored kitchen with a pipe, bib overalls, a plaid flannel shirt and high-top workshoes, Mr. Fingarson said he gave little thought to the awesome weapon down the road.

Nor has he thought much, he said, about the new antiballistics missile system that President Nixon announced would be built near here to guard his missile and 149 others like it in the Grand Forks area.

"We hardly even mention it," he said. "You hardly even know there's a missile on your land."

He just plows around the 10-acre site the Government bought in 1963 for $300 an acre.

Occasionally, he said, he pauses near the fence and looks inside.

"It's amazing how complex it is," he said.

He sometimes thinks, he said, "how much money is sunk down there—it probably cost the Government $1-million."

"There's been some talk about Minuteman won't leave the ground. I think it will work."

THREE DAKOTA FAILURES

He was referring *to three failures to fire Minutemen on* seven-second test runs from silos near Michigan, N.D.

Following a successful test firing from a silo near Rapid City, S.D., in 1965, the Air Force scheduled another test shot called *Operation Long Life 2* for Oct. 12, 1966, near Michigan.

Four days before the test, a malfunction was discovered, and the firing was put off until Oct. 19. That day it failed to operate because of a substandard resistor in the launching power supply, which, the Air Force said, could have been bypassed by a second system under wartime conditions.

The shot was rescheduled for Oct. 28 and failed again, this time because of a failure of a miniature capacitor in the guidance and control mechanism.

Last Aug. 14, the test, renamed "Operation Giant Boost," failed again before an audience of high-ranking officers of the Strategic Air Command, Pentagon officials and members of the North Dakota Congressional delegation. A faulty pin in one of the umbilical connectors was at fault.

MORE TESTS AHEAD

Acting Air Force Secretary Alexander H. Flax, in a letter March 12 to Senator Milton R. Young of North Dakota, said that further tests would be held later this year.

The failures have led to cynicism on the part of some.

"*They always have a wet fuse or something,*" said James Wallace, a restaurant equipment salesman from Fargo, 74 miles south of Grand Forks.

Mayor Herschel Lashkowitz of Fargo, an opponent of the antiballistic missile system, said he felt neither qualified nor willing to "sit in judgment of the President of the United States." But he added his personal thoughts:

"There is no provable certainty that the Minuteman missiles themselves have a capability worthy of being guarded.

"One of the tragic-comic events is the repeated failure of the Minuteman missile in the face of glittering promises and expectations.

"Furthermore, I've heard a great deal of concern expressed that the Sentinel system means a possible neglect of the priorities of the American cities."

The Air Force, thought to be privately embarrassed over the misfirings, points to several hundred successful tests at Vandenberg Air Force Base in California.

COLLEGE STUDENT PROTESTS

Though there were demonstrations in Fargo and Grand Forks last weekend against the ABM, they involved college students primarily. Residents there seemed more interested in the predicted heavy flooding of the Red River, which flows north past the city into Canada.

In rural areas, the worry was more over the low price of wheat—$1.40 a bushel.

In Concrete, N.D., 18 miles north of Mr. Fingarson's farm, few questions are raised about either the Minuteman or the Sentinel systems. Both are regarded as a boon to the local economy.

Since a cement plant closed in Concrete more than 40 years ago, the town has been dwindling. Sixteen people live there and lately Army Corps of Engineers trucks have been seen, taking test borings of the soil for a possible ABM site.

Mrs. Melvin Herzog runs the post office in an old bank building that also serves as a general store. She feels it is likely that Concrete could be chosen as a Sentinel site. The Army digging has been going on since last summer.

"EXCITEMENT" ON THE WAY

Mrs. Herzog was upset with an article in The Grand Forks Herald, which said Concrete was a "ghost town."

If the missiles come, her husband is thinking of opening a trailer park.

"We all think it will create a lot of excitement," she said.

She said of President Nixon, "I just love him."

Lawrence Lawson, whose farm is near Concrete, will not be tilling his two quarter sections this year. He rented the land out, he said, and plans to "get a job in the missile."

Asked his reaction to the demonstrations against the ABM, he said, "A bunch of kids in Grand Forks are doing all the protesting. What the hell do they know? They're 100 miles away."

Axnis Johanneson, a farmer interviewed in a general store in Mountain, N.D., said he had no worry over the missiles. He is struggling to make a living on a 320-acre farm.

"If I could get $2 a bushel for wheat, I wouldn't have no worry," he said.

Through the countryside, cables linking the Minuteman missile silos can be traced by posts topped with a dayglow orange stripe.

In an Air Force press release printed in the Farm and Home tabloid insert of The Grand Forks Herald last June 8, farmers were asked not to tamper with the sometimes inconvenient posts. The release stated:

"Your cooperation as a modern Minuteman assisting the Air Force in the defense of the United States will be greatly appreciated by the Air Force and will give you that old warm feeling deep down inside for doing your part as an American."

[From The Congressional Record, Feb. 19, 1969]

THE CASE AGAINST ABM—I: EVEN MILITARY IS SHARPLY DIVIDED

(NOTE.—Deployment of the multibillion-dollar anti-ballistic-missile system called Sentinel, the first battery of which was scheduled to be located in Greater Boston, has provoked a nationwide storm of criticism and controversy. As a sequel to its initial in-depth survey of ABM conducted more than two years ago, The New Bedford (Mass.) Standard-Times presents 12 articles, of which this is the first, documenting the case for halting Sentinel deployment.)

(By Everett S. Allen)

WASHINGTON.—"I don't know why a nation that is approachng a trillion dollars in the gross national product can't afford a gadget to protect its civilization," Rep. L. Mendel Rivers, D–S.C., chairman of the House Armed Services Committee, commented in August 1966, in defending deployment of an antiballistic missile system.

Rivers' comment was made to The Standard-Times, which published at that time one of the nation's first in-depth studies of the controversial ABM system and concluded the weapon was too costly, too unreliable and that we should not go ahead with it.

On Feb. 7 of this year, Rivers said he wholeheartedly agreed with the decision of the day before by Defense Secretary Melvin F. Laird to halt work on the Sentinel ABM system, pending high-level review of it.

Said Rivers, "I want to be sure that (it) is the best system and that there isn't a system less costly."

This about-face by the House Armed Services Committee chairman is a direct reaction to the growing tide of broadly based objection to ABM deployment.

That objection was evident on Jan. 29 in Reading, when Greater Boston residents booed Brig. Gen. Robert P. Young of the Army Engineers Corps because he protested, "When you refer to the antiballistic missile system as the Army's program, you must remember it is the nation's program."

The booing symbolized the fact that the ABM is the most controversial weapons system in the history of the United States, that its scheduled "thin line" deployment—ostensibly to protect the nation against Communist Chinese intercontinental ballistic missile attacks—has aroused unprecedented opposition among both experts and the general public.

MILITARY DIVIDED

Even the military is sharply divided on whether the system would work or add anything to our national security.

ABM promises to be one of the major issues facing the Nixon administration and the Congress.

This Standard-Times series, based on interviews with scientists, legislators, records of congressional proceedings and research of Washington files, is designed to define the ABM question and to document the extensive evidence proving that deployment of the system now is a wasteful boondoggle.

The divergent views this subject embraces are made clear in the following comments:

Sen. Russell, D–GA., urging approval of $387.4 million in procurement and deployment funds for ABM: "If the world ever has to start over with a new Adam and Eve after a nuclear holocaust, then I want them to be Americans, not Russians."

Dr. Jerome Wiesner, former science adviser to President Kennedy on weapons systems: "The ABM system planned by the Pentagon is both needless and useless. I don't think we know how to build an ABM system that would really be any good."

THIN-LINE SYSTEM

The system now under reconsideration is a $6 to $9-billion "thin-line" defense against a Chinese Communist attack, although Russell and many others have pointed out that this setup, called Sentinel, might well be the cornerstone for a full ABM system against Russia that could cost $50 billion, or much more.

Thus far, no one, not even limited ABM proponents, have suggested that the "state of the art" would permit us to build an antimissile system that would be effective against Russia.

The Sentinel system as now planned provides for deployment throughout the United States of from 15 to 20 batteries. The missiles are expected to cost from $1 million to $2 million apiece; each of the related radar units would cost an estimated $100 million, and operating costs for the system have been estimated by the Army at $500 million a year.

Opponents suggest this figure is low, and would more likely reach $1 billion a year.

It was expected that the first battery would be operational in the early 1970s and the entire system within five or six years. The three sites thus far selected include Boston, Chicago and Seattle, and mounting public opposition—for a wide variety of reasons—has erupted in each.

TWO TYPES OF MISSILES

What is the Sentinel system?

It is composed of two types of missiles and two types of radars, the latter feeding impulses to a computerized central "nervous system."

One radar is a Perimeter Acquisition Radar (PAR), a long-range detection and tracking instrument capable of scanning the horizon. The other radar is a Missile Site Radar (MSR), designed to track incoming targets at shorter ranges than the PAR and to track U.S. missiles to their encounter with an attacking missile.

The larger of the two missiles is Spartan, a three-staged rocket with a range of several hundred miles. It carries a nuclear warhead and is designed to intercept incoming missiles above the earth's atmosphere.

The smaller missile is Sprint. It also is nuclear-tipped; has two stages and, like Spartan, is fired from an underground silo. It has high speed and limited range and is designed to intercept attacking missiles that have pierced the long-range Spartan defenses.

In theory, the system would begin to function when incoming missiles were spotted by PAR more than 1,000 miles away. PAR would track them for a minute or two, establish their trajectory, and feed the data to a computor.

A Spartan missile would be launched to intercept the attacking missiles hundreds of miles distant in outer space. It would fly at about 5,000 miles an hour and, at its nearest point to the enemy missile, explode its hydrogen warhead with the impact of millions of tons of TNT.

BACKUP MISSILE

Any enemy weapons penetrating this nuclear defense would encounter the shortrange Sprint, which is capable of climbing thousands of feet in a few seconds, and of making interceptions between 5,000 and 100,000 feet, at ranges between 15 and 25 miles.

Sprint's operation is all within the earth's atmosphere, where it is easier for radar to identify decoys and other devices designed to confuse the defender. Its warhead is smaller than that of Spartan; its explosion probably would be about 20 miles in the air.

Spartan is 55 feet long and 50 times as powerful as the 27-foot interceptor Sprint. As Dr. Ralph E. Lapp, a leading U.S. nuclear scientist, has commented, "(Sprint's) primary purpose is to protect the Sentienl's radar sites, without which the whole system would be useless. In a 'thick' system, however, thousands of Sprints would be required to deal with warheads that have evaded the Spartan defenses."

ABM sites, as demonstrated by that in Greater Boston, the first in the nation, require 180 to 250 acres. In the case of Boston, the PAR would be located in a state-owned forest in North Andover. The remainder of the installation, including the MSR, Sprint and Spartan missle "farms" and auxiliary equipment, would be located at Camp Curtis Guild, which is in Reading, Wakefield and Lynnfield. The commonwealth also owns the Curtis Guild property.

At the Jan. 29 meeting in Reading High School of largely anti-ABM residents, former presidential aide Richard N. Goodwin declared, in referring to the argument that ABMs could be used to destroy enemy missiles fired by accident, "We are reaching a major point in the nuclear era. For the first time in the atomic age (if ABM is deployed), there will be no reasonable time to reach a presidential or cabinet decision about using nuclear weapons."

THE CASE AGAINST ABM—II: REACTION DELAY PUZZLES BRASS

(By Everett S. Allen)

WASHINGTON.—The leisurely crystallization of Greater Boston opposition to ABM (called by one Reading protester the "bomb in the backyard") has mystified some government and Army officials who point out that at least some area residents have known for months what was intended.

In the beginning, only the Camp Curtis Guild proposal attracted much opposition. There was concern about the unpleasant appearance of a military facility in the choice suburban area, the threat of lowered property values, higher insurance rates, and radar interference with television reception.

Yet as recently as the middle of January, Sens. Edward W. Brooke, R-Mass., and Edward M. Kennedy, D-Mass., reported no large volume of protesting mail.

This is not the case now; grass-roots opposition is rising rapidly, and one anti-ABM senator predicted that "the initial flow makes me suspect it is going to get very, very heavy."

ASKS FOR HALT

The rise in protest moved Kennedy on Feb. 1 to ask the administration for a halt in ABM site preparation until Congress can reappraise the system.

The same protest prompted the administration to reply a week later by announcing suspension of work on the $6–$9 billion Sentinel system.

In part, the delay in opposition may have had little to do with the real issues or—public safety and need for effectiveness of the weapon—but may have stemmed from general lack of information and a belief that an ABM site "in the backyard" would be good for the local economy.

A Sentinel Systems Command official to whom I talked cited the case of the civilian at an antimissile briefing who said, "I thought we'd had antimissile missiles deployed for years."

As for the economy, and the community relationship generally, this is what a local ABM site amounts to, as demonstrated by the Reading-Wakefield situation:

The Army proposes spending $100 million on each site. Here in Massachusetts, approximately 1,300 works would be expected to take two years to complete the project. If the ABM battery is completed, it will be manned by approximately 600 people, including 300 civilians. Barracks would be constructed on the base for an estimated 200 unmarried soldiers.

Electricity and water would be purchased from the town of Wakefield. The payroll for each proposed ABM site has been estimated at from $2 million to $3.5 million annually. Some off-base housing would be required. The Army has said there would be less than "one child per class at the elementary level" added to local school systems.

NO TALL STRUCTURES

In terms of esthetics, the Army has emphasized there would be no tall structures (the MSR building is 30 feet high and 120 feet on a side, trapezoidal); the missiles would be underground, and has promised to plant trees in response to protesters who do not want to look at a missile base.

But the opposition rises, in large measure concerned with what is acknowledged by both pro and anti-ABM camps as the "remote" chance of an ABM accidental explosion. Even though there has been no such accident in all of the 24 years since Hiroshima, Chicago ABM opponents called the possibility a "serious safety threat."

What they are immediately concerned about is the proximity of the ABM sites thus far selected to major population areas. David R. Inglis, senior physicist at Argonne National Laboratory, concluded, "There is no serious reason for the Spartans to be close to cities, since their effectiveness must be nearly uniform over the central part of the 600 to 1,000-mile wide region they attempt to defend.

"Designers have worked hard to make the control devices as effective as possible, and they must be good, for the record is very good. However, the Spartan warhead, described as 'in the megaton range,' indicates a weapon approximately a hundred times as powerful as the bomb that destroyed Hiroshima and took 230,000 lives from a half-mile in the air. Its local fallout from an accidental surface blast would be highly lethal."

At the Reading public meeting on Jan. 29, George Rathjens, MIT faculty member and former deputy director of the Defense Department's Advanced Research Projects Agency (ARPA) under President Kennedy, said the Army feels it must have ABM sites near large cities "for any significant protection against Russia."

Officially, neither the Army nor the government ever has conceded that the present "thin" defense is intended as anything but a shield against the Chinese Communist nuclear threat.

ACCIDENT IMPROBABLE

Dr. Rathjens acknowledged that an accidental explosion at an ABM site is "extremely improbable," but added that if the warhead of a Spartan missile, with an explosive power of 1 million tons of TNT, went off accidentally, it would cause nearly total destruction for a radius of five miles.

Fear of such a possibility, remote though it may be, has prompted the Northern Illinois Citizens Against the ABM to file a lawsuit seeking to force the Army to drop its Glenview site near Chicago.

Reacting to this type of pressure, the Army recently conceded that it would be feasible to install ABMs a hundred miles from Chicago and still defend the city against an unsophisticated Chinese missile threat. But the Army insisted that as Peking improves its missile capability, defenses much closer to the city would be required.

The public safety fear, even though the Army, on the basis of its own record, probably can answer this criticism better than others, seems to be the trigger that has fired the strengthening anti-ABM movement.

If opposition to antimissile deployment ever could have been dismissed as a crusade embraced only by the advocates of "make peace, not war," that is no longer accurate.

There is a broad base of protest, ranging from the scientist who says ABM won't work, including the admiral or general who thinks weapon dollars are better spent on offense, to the taxpayer who says, in effect, "I don't think a military base in my community will be an asset, and I don't want to spend every day wondering whether my community will be the first to break the Army's execllent record of no accidental nuclear explosions."

THE CASE AGAINST ABM—III: SHELTER SYSTEM, A QUESTION MARK

(By Everett S. Allen)

WASHINGTON.—"The presence of an antiballistic missile (site) near a city may require civil defense shelters in order to protect the city, not merely from incoming bombs, but from atomic bombs used by its own ABM.

"The question of the need for civil defense to accompany ABM is in dispute and has not been frankly discussed by the Department of Defense at any great length."

This is the conclusion of an analysis by the ABM committee of the Seattle Assn. of the Federation of American Scientists, headed by Philip A. Ekstrom, predoctoral research associate in physics, at the University of Washington.

Advocates of an ABM-oriented shelter system estimate its cost at $50 billion.

The reference to "atomic bombs used by its own ABM" means the short-range backup missile, Sprint, designed to explode in the earth's atmosphere, at an altitude of 20 miles or less.

DIVIDED ON CIVIL DEFENSE

The diametric difference of opinion among experts as to the importance of civil defense with relation to ABM is a major contributing factor to the rising public uneasiness that may force the government to permanently halt deployment of the system.

For example, Lt. Gen. Alfred D. Starbird, the Army's manager for the Sentinel system, said, "If it ever became necessary to launch, the missile would leave the silo and fly to an exceedingly high altitude. It would be disarmed; it would continue

to be disarmed, throughout much of its flight. It would have to stay disarmed; it could not be armed until it was at an altitude where it cannot harm persons or structures or facilities on the ground . . .

"I have lived with the design and the safety features in weapon systems for a great many years. It is my personal opinion that there cannot be, it is not possible to have, a harmful nuclear explosion with this system, and with the elements as contemplated for deployment."

A related question was included in an Army fact sheet made available last November;

Q. Dose the presence of a Sentinel site near a city increase the possibility that the city will be a target?

A. The major cities, of course, are already prime targets due to their larger population and industrial importance. Whether the presence of Sentinel will further increase the priority of any one in the eyes of an eneny power is a matter that is difficult to assess. However, the presence of Sentinel will significantly increase the protection of the populace and the area from missile attack.

SAY REASONS GOOD

However, the Seattle committee concluded that the government's "reticence about including among (ABM site) criteria the fact that the radars and Sprint missiles are to be placed next to cities is understandable because there are good reasons for keeping the sites away from cities."

This view is buttressed by two arguments:

1. The Chinese may attempt to knock out the ABM radar sites in a first-wave of intercontinental ballistic missiles (ICBM) so that following waves would not be blunted by the long-range Spartan missiles, and so might attack the sites heavily. This suggests that the radar sites could become in Dr. Ralph Lapp's phrase "megaton magnets," drawing a disproportionately large number of atom bombs to the site and, if the sites are next to cities, to the adjoining cities.

Obviously, if the Sprint missile system should fail this large number of bombs would explode near the sites and their adjoining cities.

2. Even if the system does not fail and Sprints are detonated in the atmospnere above the radar sites, the committee found that "the resulting heat, light and blast may cause very great damage in nearby cities, as Lapp and others have pointed out."

Further, the use of increasingly good decoys by the enemy—acknowledged as inevitalbe by both pro and anti-ABM forces—presumably would mean that these explosions would occur at lower altitudes, nearer people.

MUST INCLUDE SHELTERS

The Seattle group found that if any ABM system, even an "austere" anti-Chinese system, is to be effective in saving American lives, then it should also include "an adequate shelter system" for our civilian population.

To build an ABM system without providing blast and fall-out protection for the population, the West Coast scientists concluded, "would remove any aspect of credibility in the argument that ABM is primarily intended to defend the population".

This is an important point because the argument has been made in defense of ABM deployment, by Gen. Earle Wheeler, chairman of the Joint Chiefs of Staff, former Defense Secretary McNamara, and former President Johnson.

The Defense Department budget for fiscal year 1969 did, in fact, include $77 million for the civil defense program, of which approximately $31 million was for shelter development and acquisition.

However, the Seattle group compared this figure with estimates of costs for "realistic protection" against nuclear attack made by Holmes and Narver, Inc., for the Oak Ridge National Laboratory in 1965.

This study analyzed the tunnel grid blast shelter concept developed by the Project Harbor Civil Defense Study Group, which was directed by Prof. Eugene Wigner of Princeton University. It provides for one month's occupancy by urban populations, against fallout and to withstand blast overpressures up to 100 pounds per square inch. This degree of blast protection, incidentally, is substantially less than that now given to Minuteman missiles in hardened silos.

The cost for such shelters was estimated to be $515 per person, at 1968 prices. The estimate does not include the cost of land or maintenance and stocking of food and medical supplies. At the estimated price, the cost to afford this degree of protection to our urban population of about 75 million people would be more than $38 billion.

MORE FOR TOWNS

To provide such protection for our population in small towns and rural areas would cost much more. According to this reasoning, protection of our civilian population, which is the principal stated reason for deploying a Chinese-oriented ABM, should cost about 10 times the estimated cost of the ABM hardware (at least $5 billion.).

The Seattle Group concluded, "Instead, we find that the present Defense Department budget calls for a total civilian defense outlay in fiscal 1969 of only 6 per cent of the ABM allocation.

"At this point, one is forced to ask whether the proponents of the ABM system are indeed concerned with saving American lives."

Congressional concern over the type and number of shelters that ought to supplement an ABM system, even a "thin" one, is mounting.

Sen. Kennedy, D-Mass., Democratic whip and in the forefront of legislators who urged reappraisal of ABM, has concluded the antiballistic missile defense is "not valid" without a shelter system, the initial cost of which has been estimated at at least $15 billion.

THE CASE AGAINST ABM—IV: WHO SAYS ABM'S WON'T WORK, AND WHY?

(By Everett S. Allen)

WASHINGTON.—Leading American scientists, including all of the science advisers of the last three presidents, oppose ABM deployment because (a) they are convinced we do not yet know how to build an effective antimissile system, and (b) such a defense as we are able to build can be easily and cheaply overcome.

Former Defense Secretary McNamara, who for years resisted pressures to deploy ABM, who was thoroughly familiar with military and technical factors involved, commented, in urging more research and development, rather than deployment. "Let me make it very clear that the cost in itself is not the problem; the penetrability of the proposed shield is the problem."

The weaknesses of the Sentinel ABM system that the Army now had been authorized to deploy have been stressed repeatedly by members of the scientific community, including Richard L. Garwin, director of applied research at the Thomas J. Watson research center of the International Business Machines Corp., and Hans A. Bethe, Nobel prize winner and physics professor at Cornell University, in the March 1968 issue of Scientific American.

They are summarized as follows:

1. Spartan interceptors would cost $1 million to $2 million. It is reasonable to assume that warheads could be delivered by an attacker for less than it would cost the defender to intercept them.

2. The attacker could concentrate his strike on a few targets so that most of the interceptors would have nothing to shoot at.

EXHAUSTED BY DECOYS

3. Several hundred to several thousand relatively cheap decoys launched by a few large vehicles would readily exhaust a Sentinel-like system. The attack with real warheads then could follow.

4. Since the Communist Chinese ICBM system still is in the early research and development state, it can and would be designed to deal with the Sentinel system, whose interceptors and sensors are nearly in production and are rather well publicized, and would not all be in place until 1975.

5. A variety of penetration aids are available to an attacker. These are inexpensive and include balloon decoys shaped like reentry vehicles that are made of plastic and covered with foil or wire mesh, and fine metal wires of "chaff," scattered in large quantities to confuse the defensive radar.

6. A "blackout" of defensive radar could be caused by the large number of free electrons released by a nuclear explosion. This is because the electrons in an ionized cloud of gas have the property of bending and absorbing electromagnetic waves. This effect can reach such proportions that the defensive radar is prevented from seeing any object behind the ionized cloud.

Such a blackout can be caused both by the defensive nuclear explosions themselves or by deliberate explosions set off at high altitudes by the attacker. The offense might reasonably sacrifice a few early missiles to cause blackout at strategic radar locations.

HAVE MANY OPTIONS

Nuclear scientist Ralph E. Lapp has concluded that, "The Chinese have a variety of options they might exercise to outwit a defense shield. A 'thin' ballistic shield is apt to leak badly if attacked by missiles that deploy decoys and other devises to confuse the defense.

"The Chinese might follow our example by fitting a multiplicity of individual nuclear explosives in each ICBM nose cone. (This is called MIRV (multiple independently targeted re-entry vehicles.) It will enable a single ICBM to carry as many as 10 warheads, each of which can be precisely directed at a particular target.

"The use of large numbers of warheads allows us an attacker to saturate a defense system; he simply fires more warheads into certain ballistic corridors than the 'thin' system's antimissile missiles can handle and thereby simply overwhelms the defense.

"A crude and cheap Chinese copy of MIRV, employing a cluster of warheads and a cloud of decoys on a single target could be the downfall of a Sentinel System."

It also is noteworthy that, since the Chinese would have to shoot their missiles 9,000 miles (2,000 miles farther than would the Soviets) in order to reach America, they might choose not to build an arsenal of landbased ICBM's.

If they fired missiles from either surface or submarine vessels at much shorter range, Sentinel would constitute no defense, since it is not built to repel such an attack.

COULD SMUGGLE BOMB

The ABM Committee of the Seattle Assn. of Scientists of the Federation of American Scientists has pointed out that China also could:

1. Circumvent the ABM system with "an end run." The most dramatic of these is the smuggled bomb. Said the committee, "We have for at least 10 years had in our arsenal a nuclear warhead six inches in diameter, for use in an artillery shell. Even much larger warheads could be smuggled into the country in innumerable ways and delivered by hand to their targets."

2. Detonate a "dirty" bomb upwind from its target. Such a blast could be delivered by missile to a point far from its real target. Winds would deliver the resulting radioactivity to the desired target. Alternately, a "dirty" underwater burst just off our West Coast would "literally rain destruction on coastal cities."

Concluded the University of Washington scientists' committee, "A missile defense against China, effective even until 1980 (Defense Department estimate) would require far more than the proposed Sentinel deployment and would leave us completely undefended against many unconventional, but highly effective, styles of attack."

ALREADY OBSOLETE

Dr. Jerome B. Wiesner, provost of MIT and President Kennedy's science adviser, believes the Sentinel System is technically obsolete already.

Dr. Wiesner said, " I have come to the conclusion that any system that depends on projectiles rather than, say, on nuclear rays or electromagnetic beams or laser beams is fighting a losing fight . . .

"I don't think the defender nation is ever to know what to expect. I am convinced that the variety of techniques available to a nation planning an offensive system is great enough to keep an antiballistic missile system of the kind we are talking about totally off balance.

"Just the thought that we might develop an ABM system and, therefore, that the Russians might do the same caused us to develop a whole set of offensive countermeasures that make our Air Force and Navy confident that we do not have to worry about a Russian antimissile system." (These include missiles carrying several warheads (MIRVs) and the possibility of using the blackout attack against Soviet defense radar.)

"One of the interesting things about the ABM arguments is that the purpose seems very slippery. We were told that the Sentinel was to protect us against irrational behavior of the Chinese. Many people would contend that our already existing deterrent system will do this adequately.

"Further, a careful analysis of the Sentinel system cannot be shown to provide protection against Chinese nuclear weapons for very long unless you make some unbelievably naive assumptions about the Chinese—that they do not have access to our newspapers, or to our journals, or that they are not thinking people.

TIME TO RESPOND

"Many people do not realize that you cannot snap your fingers and wish into existence the kind of an ABM system being argued about. They do not realize that if we build an ABM system and the Russians regard it as something they do not like, they have lots of time to respond; or that if they build an ABM system, we have time to respond."

Dr. Wiesner has called the Sentinel system "senseless and totally unnecessary." He noted that he had opposed it from the beginning because "If it were effective at all, it would be only for a very short time, and I believe that it would be only a matter of time before the pressures would develop to expand Sentinel into a very costly and clearly inadequate anti-Soviet system. The Senate debate of last June shows that those pressures have already begun."

Finally, even Dr. Edward Teller, who favors Sentinel deployment, has acknowledged publicly that, although we have tested the ABM's components separately, including the nuclear device underground, we do not know how they would perform "all in one package" and cannot find out, short of war or accident, because of the nuclear test-ban treaty.

The Case Against ABM—V: ABM Debate in the Senate

(By Everett S. Allen)

WASHINGTON.—Underlying last year's Senate battle, unsuccessful yet valiant, to block ABM deployment, was the suggestion that factors other than national security motivated some members to press for construction of the Sentinel sites.

Sen. Margaret Chase Smith, R–Maine, senior GOP member of the Armed Services Committee, said, "There are strong possibilities, if not probabilities, that by the time this so-called 'thin' defense against Red China is completed, it will have become obsolete because of the rapid rate of development and change in the state of the art.

"This program has strong characteristics of being only a sop to those who have insisted on a full-scale ABM system."

CAN AFFORD TO WAIT

Her statement was extraordinary because Sen. Smith usually is found on the side of the military, yet strength is added to her conjecture because of the largely unanswered arguments against deployment raised by her colleagues.

They may be summarized as follows:

Sen. Hart, D–Mich.: We can afford to wait because according to Assistant Secretary of Defense Warnke, there has been "at least a one-year slip in the Chinese ICBM program beyond what we expected when we made the deployment decision."

Sentinel is not ready for deployment. Important components have not been adequately tested. Deployment will tend to divert resources from needed additional research and development; a delay may, therefore, result in a more effective system. By postponing the deployment, the ABM program will benefit, if it ultimately develops that deployment is in the national interest.

(In testimony before the Senate Armed Services Committee on Feb. 16, 1968, Army Chief of Staff General Harold K. Johnson described the state of development of Sentinel components in terms that hardly suggest the system is ready for deployment.

(Of the first major elements, Spartan and Spring missiles, perimeter acquisition radar, missile site radar and data processing equipment, only the Sprint has been tested as a unit as of the time of the Senate debate.)

PERCY NOTES TEST

In the course of floor debate last April 18, it was brought out by Sen. Percy, R-Ill., that 11 of 14 test firings of the Sentinel system had been successful. (Yet, to be eeffective in actual operation, every element of an ABM system must work perfectly every time.)

Sentinel would hamper prospects for U.S.-Soviet arms control agreement since its deployment clearly would cause the U.S.S.R. to react to some degree against it by developing countermeasures. At the very least, if will make more remote the possibilities of serious negotiations with the Soviets—which they have requested—over strategic armaments.

A worse possibility is that a U.S. ABM deployment will trigger a race of dangerous new armament programs, which will decrease U.S. security rather than enhance it, at enormous added cost to both sides.

Important dollar savings could be realized by postponing deployment. The cost of the system as presently planned is likely to soar beyond the official figure of $5.5 billion. In addition, in the added time gained, alternative and less costly ways of providing security may be developed, whether in the arms control area or by such means as providing protection for Minuteman ICBMs with increased site hardening. Thus, a decision to spend $1 billion now could mean wasting $5.5 billion and probably much more.

(Last January, former President Eisenhower strongly protested the Sentinel deployment decision, asserting that it was only a first step toward a much costlier Soviet-oriented system which would not do the job for which it was intended.)

CITES CONTRADICTION

Sen. Symington, D-Mo., former Air Force secretary, and member of the Armed Services Committee: "The original argument was that we did not need any (ABM) system, because our offensive capacity was being developed to the point where we could smash any aggressor.

"Then, for some reason never made clear to me, there was proposed a $30 billion defense against the Soviet Union and a $5 billion defense against a possible future threat from Red China; and the Chinese defense was chosen. For reasons I still do not understand, we decided against a defense against the Soviet Union, but did want a defense against a possible threat from China. So we saved $25 billion, just like that.

"Each year the demand for research and development in the Department of Defense increases to the point where it now amounts to $8 billion a year. This money has been put up faithfully on the floor of the Senate, year after year. I now challenge the results. What has come out of these vast sums?

"True, we have had missile program after missile program. Then they put them on the shelf, either because they are obsolete, or because they do not think they will be needed, or because they do not work. We have been getting a lot of gadgets and tricks and theories. But where is the modern hardware? You cannot fight with blueprints."

QUESTIONS JUSTIFICATION

Sen. McGovern, D-S.D.: "We find the secretary of defense and the administration saying that if we could get some kind of agreement with the Soviet Union whereby they would not deploy their ABM system, then we would not deploy our. What then happens to the argument that we need one against China? If we do need a defensive missile system against China, and if that is the 'marginal' (former Secretary of Defense McNamara's word) reason for the Sentinel, why would we make a deal with the Soviets not to build it?"

Sen. Symington: "Even if we were able to prevent 98 percent of Soviet nuclear missiles from reaching target in an all-out attack—an impossibility, just as it would be impossible for another country to prevent a substantial portion of our missiles from reaching target—2 percent of Soviet missiles hitting their targets could still destroy our cities.

"For years we have been asked to spend billions on maintaining an 'assured destruction' capability on the theory and with the premise against this gigantic cost that the best defense is a good offense.

"And now, after spending these tens of billions on the basis of that premise, we are told this is still not enough; therefore, we must now spend additional billions on this theoretical and admittedly strictly limited defense, the effectiveness of which even the Sentinel's strongest advocates admit is in doubt."

WON'T SIT STILL

Sen. Hart: "The only way I can imagine Sentinel or any other ABM deployment saving lives would be if the Soviet Union—or China, for that matter—do nothing to compensate for the deployment, in order to restore the capability to damage the United States, which had existed before the deployment was undertaken.

"But they could hardly be expected to do nothing; thus, there would be no reason to believe an appreciable number of lives would be saved. In fact, there is good reason to believe that even more lives might well be lost than had the ABM deployment not taken place.

"We must face the very real possibility, if we go ahead with Sentinel, of the Soviets responding with a more than compensating improvement in their offensive systems, especially considering the complixity of the Sentinel system, the fact that it can never be adequately tested short of an actual nuclear exchange, and that it probably will fall far short of performing as well as it is designed to do. The net effect, then, would be an increase, rather than a diminution in damage to the United States in the event war should ever occur."

EXAMPLE OF FUTILITY

Sen. Clark, D-Pa.: "I give you one example of the futility of the defense in trying to catch up with the offense. In 1959, the U.S. Army proposed the deployment of the Nike-Zeus system, the father of the present highly touted Nike X system (from which the Sentinel system was developed). The total cost of deploying this system was then estimated at $13 to $14 billion.

"This proposal was turned down by President Eisenhower, who said that, 'It is the consensus of my technical and military advisers that the system should be carefully tested before production is begun and facilities are constructed for its deployment.'

"We should also heed the words of Defense Secretary McNamara when he referred to the Nike X system in January, 1968. He said, 'Had we produced and deployed the Nike-Zeus system proposed by the Army in 1959, most of it would have had to be torn out and replaced, almost before it became operational, by the new missiles and radars of the Nike X system.

" 'By the same token, other technological developments in offensive forces over the next seven years may make obsolete or drastically degrade the Nike X system as presently envisioned.' "

THE CASE AGAINST ABM—VI; LESS DEBATE IN THE HOUSE

(By Everett S. Allen)

WASHINGTON.—Sen. Kennedy, D–Mass., has called the Senate "remiss" for not obtaining full information on the Sentinel system before approving deployment funds, but the manner in which ABM was ramrodded through the House makes the upper chamber's deliberations leaisurely by comparison.

Rep. Leggett, D–Calif., protested, "I find it no real credit to our House system to have the other body debate the ABM construction deployment for a week, passing the item by a close vote of 52 to 34, after our House considered the item and passed over the whole issue without an objection being made."

Rep. Bingham, D–N.Y., added, "I am voting against it (ABM deployment) first, because there has been a disgracefully insufficient time for the House to debate a bill of such magnitude and importance and second, because the bill, as described and defended by the chairman (Rep. Rivers, S.C.) and some members of the Armed Services Committee indicates no recognition of the need to reassess our priorities so as to defer essential or questionable expenditures."

TWO-HOUR DEBATE

Rep. Scheuer, D–N.Y., complained that, "The members have been allowed a mere two hours to debate a bill which will authorize more than a $21 billion expenditure in military procurement and research. We have been virtually denied any opportunity of examining its provisions in depth. We now propose to dispense with more than 10 per cent of the federal budget in 120 minutes; a rate of $175 million a minute. The report of this bill, which runs to 91 pages, was made available only three days ago."

Rep. Keith, R-Mass., noted during the July 11 House debate that, "I regret that we have not had an opportunity for a full debate on the ABM question at an earlier date. It would have been far better to have raised these issued back in April when the House authorized construction on the missile sites. That vote was the first step in the commitment to begin work on the Sentinel and the full range of political, technical and economic issues should have been placed before us at that time."

Keith asked, "Is it worth our money to build a system which may be useless against all but a small attack, such as the Chinese might be able to mount, using relatively primitive missiles?"

Rep. Bates, R-Mass., senior GOP member of the Armed Services Committee, replied, "The answer to that is in the affirmative." Bates commented, "It might

well be that we might lose money in this effort (the deployment), but I would rather lose some money than lose our country and we can, if we prove to be wrong on this issue."

Paradoxically, those House members who argued against ABM deployment did so on the grounds that to deploy would "prove to be wrong on this issue."

The case against deployment, as presented by Leggett and others, made these points:

There is clear evidence that the system is not technically feasible at this time and, in all probability, will not be feasible in the future.

MODERN OUTLAY

The original proposal for the Sentinel ABM system envisaged a "moderate" $3.5 billion outlay. This "moderate" $3.5 billion estimate by last summer had risen to a "modest" $5.5 billion. Leggett predicted that by 1975, the target date for full deployment, "the system will have cost $15 billion."

(It is noteworthy that January 1969 estimates of cost have risen to $5.9 billion and Sen. Symington, D-Mo., opponent of deployment, has said he believes it will be closer to $9.4 billion.)

House opposition stressed that:

The system will be no good against a fractional orbital ballistic system, or a southern orbital ballistic system, or a multiple indpendent re-entry vehicle system, or a group of multiple independent rockets, or against a submarine close-range missile. It is "fully expected" that by 1975, the Communist Chinese will have a diesel submarine ballistic missile capability against which ABM would be ineffective.

Yearly upkeep of the ABM system will cost "at least $1 billion." (This is double the Army estimate.) "Mind you," said Leggett, "this is the very basic cost and the basic estimated cost can be easily exceeded in geometric proportions before the first missile site is positioned. These costs do not include extras or operation and maintenance of hundreds of sites around the country and pay for thousands of military personnel."

WOULD BE USELESS

The California legislator added, "If 20 simple Chinese missiles are launched against a target defended by 50 Spartan ABM's, there is an 81 per cent probability of successful defense. If penetration aids . . . or low-flying missiles (fractional orbital missiles) are employed, the Sentinel system will be useless."

(The June 28, 1968, issue of Congressional Quarterly quoted an unidentified Pentagon official as stating, "for the present time, we can make greater strides (in the direction of an effective ABM) by spending small sums of money to advance technology until we have a really useful capability, rather than spending a lot to produce hardware that we know won't work.")

Rep. Kyros, D-Maine, argued that, "A small fraction of the U.S. missiles surviving a first strike, if directed against China, would destroy half of China's urban population and more than half of its industrial capacity, most of its key governmental, technical, and managerial personnel and a large proportion of its skilled workers would be wiped out.

SUICIDAL ACT

"For the Chinese to attack or to threaten to attack American cities in the face of our strategic superiority would be a suicidal act."

Kyros also noted that, "Former Secretary McNamara, in his speech announcing the decision to go ahead with a 'thin' anti-Chinese ABM system, said, 'The so-called heavy ABM shield, at the present state of technology, would in no effect, be an adequate shield at all against a Soviet attack.' "

Leggett protested that, "debate on this system in my committee lasted about 45 seconds (when the House took up its version of the military construction bill, the ABM was not debated. The construction bill carried money for sites.), but Rep. Rivers, chairman of the House Armed Service Committee replied, in arguing for deployment, "This is a beginning. We are late now. We can move into the more sophisticated areas after we make this first step.

"We do not contend that this system can do everything. It will do what we anticipate we will need in the mid-'70s with respect to Red China."

And that note, although it answered none of the questions that had been raised by dissenters, carried the day, and the House approved funds for starting ABM deployment.

The Case Against ABM—VII: The Army's View

(By Everett S. Allen)

Washington.—Major criticisms of the ABM, some of them raised specifically by The Standard-Times, have been responded to by the Army's Sentinel System Command and by Dr. John S. Foster, director of the Pentagon's defense research and engineering.

Q. Sentinel inability against decoys:

A. Army: Development and production of effective chaff or decoys to operate against our ABM system, which will be deployed in the 1970s, will require significant effort by the Chinese Communists. The effectiveness of ChiCom pentetration aids will depend upon rather specific knowledge of the Sentinel system. Even if this knowledge were acquired by the ChiComs, the Sentinel components have a significant robustness that will make the successful use of penetration aids difficult. Examples include the large kill radius of our Spartan missiles, radar diversity, and defense in depth.

Q. Complications of nuclear blast disrupting any radar system:

A. Army: The uncertainties associated with the effects of high altitude nuclear bursts in creating radar blackout would present an attacker great difficulty in confidently planning an attack depending on this effect. In designing Sentinel, we have taken into conservative account the blackout problem and uncertainties thereto to include geometric diversity of radars and selection of radar frequencies.

CLAIM UNFOUNDED

Q. Civilian fallout shelters for protection from our own defensive missiles:

A. Army: The inference that a major fallout shelter program was, and is, required because of the detonation of defensive nuclear warheads over our cities is without basis. In fact, the intercept altitudes and defensive yields of the Sentinel antiballistic missile defense system would not cause a significant direct threat to our population by either fallout, thermal or blast overpressure effects.

A civil defense shelter program continues to be a complement to active defense which would further reduce casualties due to enemy nuclear weapons.

Q. Defense against submarine-launched missiles:

A. Army: The Chinese Peoples Republic threat against which the Sentinel system is designed to counter does not dictate that it would counter submarine-launched missiles.

However, inherent capabilities of Sentinel make successful engagement of some such missiles highly probable. Further study on this subject is being conducted by the Department of Defense.

Q. Cost versus effectiveness:

A. Army: The question of Sentinel effectiveness must be examined in light of the stated objective of the system. Although we cannot predict with certainty exactly what targets in the United States the Chinese might attack, we can be assured that 10, 20 or 30 thermonuclear warheads detonating over our country could produce many fatalities.

The Sentinel system will produce a high assurance of no fatalities in the event of a Chinese attack for at least a decade after the system attains an initial capability. It is not at all clear that ChinCom offense costs will be less than U.S. defense costs. In any event, the key issue is not whether the United States can afford to defend, but rather can we afford not to defend.

NOT TO TEST VALUE

Q. Why no scheduled Sentinel tests until 1970?

A. Army: These are to "exercise the responses" of the Sentinel ABM system, not an examination or trial to prove value. The Sentinel system represents 12 years of intense research and development effort. A substantial portion of the nation's best scientific and technological abilities have been devoted to its development.

Previous tests have demonstrated that the deployed system can with confidence defend the United States from relatively simple missile attacks commensurate with our estimate of Communist China's capability in this field for the next 10 to 15 years.

(Aviation Week and Space Technology of July 8, 1968, said that in early 1970, it is planned to fire as many as 80 separate Minuteman missiles over a two-year period down-range from Vandenburg Air Force Base into the Kwajalein Atoll in the Pacific.

(It is reported that, "the initial shots in the series are expected to be directed largely at determining whether Sentinel radar can discriminate targets from decoys, and to assess the so-called threat cloud created by warheads and penetration aids.")

Q. Effectiveness of Sentinel?

A. Foster: We never said that we had a 100 per cent confidence in intercepting all, either in the early stages or in the late stages. Rather, that we have high confidence of being able to intercept. There is scientific disagreement and I'm certainly aware of that. I myself have argued on both sides of this issue before making a recommendation to the secretary of defense.

DECOYS CONSIDERED

Q. Many well known scientists have said that the Sentinel system can't meet the objectives that have been stated for it and that it will be swamped by an enemy attack and by the use of decoys, chaff and the like. Has all of this been adequately considered:

A. Foster: I can assure you that all of this has been fully and adequately considered. Before the secretary of defense decided on the deployment, he had available to him the best intelligence evaluations that could be secured. We called in the best brains to consult with us, both those who recommended the deployment and those that did not.

Only after considering all facts that were presented did the secretary of defense decide that deployment must go forward and as quickly as possible. I shall point out, too, that there was no disagreement among the senior individuals concerned after all the facts and advice had been made available.

Q. Why deploy against the Chinese Peoples Republic when a deployment is not being made against the Soviet Union?

A. Foster: We are convinced that the Sentinel deployment can meet effectively the CPR emerging threat, for a period of many years, and at acceptable cost. One can argue that the CPR would be afraid to attack us anyway, but this would not be a prudent course considering that even their emerging small capability could kill many millions of our people.

Since our strategic planning must always be conservative, and must take into consideration even the possible irrational behavior of potential adversaries, I believe the only prudent step is to proceed with Sentinel.

The thin scope of the Sentinel system should not upset the balance of strength between the United States and the U.S.S.R. On the other hand, it appears that a much larger effort would be required to counter full potential capability of the U.S.S.R. by an antimissile system.

Even if that effort were made by the United States, it would be possible for the U.S.S.R. to add to its own force to counter us. For this reason, we continue to count on the deterrent of our existing and improving strategic offensive forces to meet this threat.

DIFFERENT OPINIONS

At the end of an interview with a Pentagon scientist, who requested no attribution, I asked: "Why do you think that, for the first time in our history, all four science advisers of the last three presidents are opposed to what you are doing—deployment of ABM? Advising presidents on the worth of weapons systems was after all, their speciality?"

He replied, "It is simply a difference of opinion."

Assuredly it is, but what concerns anti-ABM forces is that the difference is one of diametric opposition, that it involves billions of dollars and what Dr. Jerome Wiesner, one of those presidential advisers, has called our ability to maintain "a rational world."

Further, it is inescapable that those who oppose ABM deployment principally have no professional, political or economic affiliations that would influence their opinions.

The Case Against ABM—VIII: The Military-Industrial Complex

(By Everett S. Allen)

Washington.—To a degree that will remain forever unknown, the decision to deploy the Sentinel system was influenced by factors of politics and economics, rather than national security.

In reporting last June 27 that, according to civilian and military sources within the Pentagon, at least $10.8 billion worth of defense projects could be cut from the current budget without affecting national defense, the respected Congressional Quarterly singled out the ABM for criticism.

Said CQ, "Probably one of the most clearcut items of (budget) 'fat' in the view of most of our sources, was the ABM system. (They) doubt it will have any chance of working against a realistic attack. . . . Thus far, the United States has been unable to attain acceptable reliability with far simpler missile systems designed for anti-aircraft use. In simulated combat tests, these missiles have shown both a low level of readiness and a poor 'kill' ratio."

Congress should have had this information available, yet a majority of its members approved Sentinel system deployment. Why? In part, for reasons of dollars and jobs.

WARNED OF INFLUENCE

In 1961, President Eisenhower warned against "unwarranted influence" with the federal government, and especially the Defense Department, by what he called the "military-industrial complex."

Secretary of Defense McNamara's Sept. 18, 1967, decision to deploy a thin antiballistic missile system has, in the words of CQ, "been widely depicted as one of the greatest victories ever for the 'military-industrial complex.' "

McNamara for years opposed ABM deployment on grounds the system was too expensive and unreliable. However, the more than $2.4 billion spent on research and development over the last decade built a powerful constituency for the program.

It has been estimated that more than 15,000 companies stand to profit from the decision to deploy the ABM system, including several in Massachusetts.

Last year, when Western Electric Co. received Army contracts totaling $475.6 million for continued research and production of the Sentinel system, it announced it expected to subcontract more than 60 percent of the contracts to more than 3,000 companies.

Major subcontractors for the Sentinel project include General Electric Co., Raytheon Corp., McDonnell Douglas Corp., and Martin Marietta Corp., all of whom have contracts totaling $30 to $50 million.

EMPLOY 1 MILLION

Frederick W. Collins, writing in the New Republic, suggested that 28 of the major contractors for the ABM project employ about one million people in 172 congressional districts in 42 states.

One brokerage firm reportedly told its clients during the summer of 1967 that the expected decision to go ahead with the ABM would be the "day they will shake the money tree for electronic companies."

During the third quarter of 1967, 75 mutual funds sold $90 million in other stock holdings and invested the proceeds in electronics.

Defense spending in fiscal 1969, apart from costs of the Vietnam war, is expected to be in excess of $50 billion. The fiscal 1967 Defense Department payroll spread among the 50 states totaled $9.3 billion for military personnel, and $8 billion for civilian personnel.

The nation has 991 major private defense plants and defense-oriented government installations, including those owned and operated by or for the armed services, the National Aeronautics and Space Administration and the Atomic Energy Commission. Of these, Massachusetts, for example, has 45, located in every congressional district but one.

FORESEE NEW JOBS

The Wall Street Journal on Dec. 31, 1968, noted that: "Construction unions eye new jobs promised by the Pentagon's Sentinel anti-missile system. Military brass tell union chiefs each of the 15 to 20 anti-missile sites will require employment of 900 to 1,375 construction workers for an average of 22 months."

On Jan. 23 of this year, the Morrison-Knudsen Co., Inc. of New York was awarded a $2.2 million Army contract for construction work at the site of the nation's first Sentinel ABM in North Andover.

Sen. Thruston B. Morton, R–Ky., said President Eisenhower's warning against undue influence by the "military-industrial complex" is "of more significance today than ever before . . . With today's big defense payrolls, it's only natural that defense contractors want to develop a better gun, ship or some other defense mechanism . . . The answer is for the electorate to be aware of this tendency and keep it from getting out of hand."

Writing on the "Growing Threat of our Military-Industrial Complex" in Harvard Business Review, May–June 1968, Jack Raymond warned against the "disparate impulses that go into the military-industrial complex, ranging from a crass desire for profits to honest fear for the safety of the country (that) may coalesce in such a powerful advocacy of more and better weapons and in such potent opposition to arms control that the entire country will be drawn to support this opposition."

ANTI-GOP MISSILE

As for the political aspects of the decision to deploy, Sen. Margaret Chase Smith, R-Maine, ranking GOP member of the Armed Services Committee, said she had heard the ABM system referred to as an "anti-Republican missile defense system."

She added that, "I do not like to think that the Executive Branch would waste the $5–$6 billion that the installation of this system will cost merely to avoid a response on the merits to charges that the United States is without a ballistic missile defense."

In his 1969 book "The Weapon Culture," nuclear physicist Ralph E. Lapp wrote that following the disclosure late in 1966 that the Soviet Union was deploying an ABM system, "prominent Republicans—presidential hopefuls among them—strongly advocated immediate action on U.S. ballistic missile defense.

(In an Associated Press interview in September 1967, Richard M. Nixon called on the United States to "go ahead at all costs" to build an ABM system. When the Senate first authorized Sentinel deployment last year Nixon, then a presidential candidate, called it "a major step toward candor and clarity.")

"With this issue now given a political slant," continued Lapp, "the White House became vulnerable to a 1968 campaign attack that the incumbent administration had failed to provide adequately for the nation's security. Such Republican 'missile attack' involved political warheads whose punch was measured in mega-votes, not megatons."

And Dr. Jerome B. Weisner, former science adviser to President Kennedy, said, "We ought to regard the Sentinel as a bad joke perpetrated on us by Mr. McNamara and Mr. Johnson in an election year. It seems to me that their very rationalization—that it was to defend us against China, but we would stop building it if the Russians agreed not to build one—demonstrates that."

THE CASE AGAINST ABM—IX: RECORD OF THE WEAPON BUYERS

(By Everett S. Allen)

WASHINGTON.—Some of the opposition of ABM deployment stems from a civilian skepticism that has been building for several years concerning the military's weapons acquisition processes, its estimates of costs, and its evaluations of what and how much are needed.

Closely allied is the performance of what are known as "high risk" electronics systems, for the Army claims that Sentinel and its radars and computers, a major electronic complexity, are capable of performing the delicately synchronized tasks demanded of an effective antimissile system.

Recently, a report entitled "Improving the Acquisition Process for High Risk Electronics Systems" was made public in Washington.

It was prepared last year to satisfy a course requirement while the author, Richard A. Stubbing, 38, was attending Princeton University. Stubbing is an examiner in the Budget Bureau, where he has been since 1962.

He is a graduate of Notre Dame and the Harvard Business School and at the bureau, has been the examiner for Air Force ballistic missiles, Navy aircraft, tactical aircraft and strategic offensive forces.

Stubbing studied a sample of 13 major Air Force-Navy aircraft and missile programs with sophisticated electronic systems initiated since 1955 at a total cost of $40 billion.

ONLY FOUR RELIABLE

He concluded that of the 13, only four, costing $5 billion, could be relied upon to perform at more than 75 per cent of their specifications.

Five others, costing $13 billion, were rated as "poor" performers, with an electronic reliability of less than 75 per cent.

Two more systems, costing $10 billion, were phased out for "low reliability" after three years, and the last two were cancelled, after an expenditure of $2 billion.

Stubbing noted, "(Thus) less than 40 per cent of the effort produced systems with acceptable electronic performance—an uninspiring record that loses further luster when cost overruns and schedule delays are also evaluated."

He also concluded that:

1. Contractors "in almost every instance" advance for new weapon systems high-risk proposals involving new or modified computers and radars, rather than integrating "off-the-shelf" equipment.

He attributes this to a desire to make the proposal attractive and to gain the added sales volume from designing and developing new electronics equipment.

PERFORMANCE BAD

2. The performance of the multibillion-dollar weapons systems started in the 1950s was bad; those of the 1960s are worse. Stubbing concluded, "The results already in indicate a retrogression in electronics performance, along with a telescoping of development schedules and continued large cost overruns."

3. The record of electronic systems in 12 important military programs begun in the 1950's indicates that only five perform up to standard or better.

4. The aerospace industry, "with a high wage structure and a reputation for inefficiency in production techniques," still achieves a 12 per cent greater return on equity than the average of all U.S. industrial firms.

5. The recent trend in airborne military electronic programs has been toward highly complex, crash programs with "established technical parameters almost impossible of attainment."

6. Competitive development of high-risk electronics systems, now lacking, offers the best prospect of imposing maximum incentives on management and improving the quality and cost of the final product.

COMMENTS ON STUDY

Sen. Symington, D-Mo., who noted that "we have a long series of failures in missiles which have cost the American people somewhere between $7 and $10 billion dollars," was moved to comment on Stubbing's study.

Symington said, "As a result of this study, I would hope there would be more understanding of why some of us suggested during the last session that this government continue with research and development on the new ABM system, but not place orders for its production.

"The proposed ABM system is far more complicated than any of the systems referred to in this study.

"Over the years, I have been protesting the 'gadgetry' aspect of our current defense procurement as against the obtaining of workable hardware.

On Nov. 6, 1967, National Observer commented, "Military men are rarely as technically proficient as their industrial counterparts. In short, they don't always know what they're buying.

"If they resist, the companies will go over their heads—a retired general on an industrial payroll will ask a high-ranking military colleague to see 'what the fuss is all about'—and the company often ends up having its way. In addition, defense contractors are always on the lookout to hire retiring officers.

"The point to remember is that retired high-ranking officers have many friends still in the service. Some, they were influential in appointing. Naturally, the retired officers will be listened to."

REMEMBER PRIOR GAPS

Finally, in listening to proponents of the "ABM gap" theory, a fairly large audience remembers the myths of the "bomber gap" from 1955 to 1957, and the "missile gap" from 1957 to 1961.

Both of these alleged "gaps" in American foreign policy proved to be nonexistent, despite the fact that many of the highest strategists in our defense community believed and propagated the greatly erroneous statistics on which the "gap" theory depended.

The fact was that, during the period of the alleged missile and bomber gaps, the Russians produced only four percent of the missiles and only 20 percent of the bombers that American Intelligence had claimed they could produce.

The American reaction to these greatly mistaken assessments by "experts" has produced a multibillion-dollar arsenal of nuclear weapons capable of annihilating the Soviet Union as a viable civilization within a day and perhaps within an hour.

Coupled with evidence that the Russians have slowed or halted their limited ABM deployment, our "gap" experience has made Americans less eager to build new weapons every time somebody presses the panic button.

The Case Against ABM—X: The Russian View

(By Everett S. Allen)

Washington.—One sound reason for not building an American anti-missile system now is that the Russians, traditionally more interested in defensive than offensive weapons, have spent millions trying to establish an ABM setup and may have wasted much of it because of formidable technical difficulties.

One of their own experts has conceded that the problems of ABM presently outnumber the solutions, a factor that has influenced the Soviets in deciding to slow down, if not actually halt, their deployment efforts.

Some clues to the problems with ABM that the Russians have encountered may be found in a treatise on antimissile weapons—ostensibly, an evaluation of Western systems, yet revealing in its objective analysis of ABM generally—by Soviet scientist N. F. Shibayev. This study was translated into English last year, and a copy of it is in the Library of Congress.

NOTES PROBLEMS

Shibayev makes these points to emphasize the difficulty of creating an effective antimissile defense:

Missile warheads can be screened to prevent radiation, thereby diminishing their vulnerability.

Their trajectories, when they enter dense atmospheric layers, may be turbulent or smooth, or may change the direction of flight.

Warheads may produce active and passive jamming of defense radar stations.

Apart from the high average speed of flight of the ballistic missile, and the consequent lack of time for counteracting it, it is of small dimensions and presents a smooth, streamlined surface which hinders its detection by radar.

It is necessary to destroy all the attacking missiles, and not merely part of them.

Nose sections of the ballistic missiles are "very solid, a fact which hampers their destruction or demolition."

EASILY JAMMED

Radar stations of the antimissile defense are very sensitive and are easily jammed, either by jammers installed in the missile, in a container ejected from the missile, or independently launched jamming sources.

The task of interception would be much more simple if the radar that identified the target were also capable of guiding the interception of the target, but "the two tasks are, in principle, distinct."

The "brain" of the whole system is a high-speed digital computer that provides for the interception of single and group targets and which can carry out 200,000 arithmetical operations per second.

Target identification—that is, identifying warheads on a background of numerous false targets—"is considered to be the weak spot of the entire U.S. antimissile system."

Concluded Shibayev, "All these factors, and others, lessen considerably the effectiveness of the antimissile operation, and the problem of antimissile defense is just beginning."

MOVED BY UNCERTAINTY

An uncertainty as to what the Soviet Union has done in the ABM field as recently as last June gained congressional supporters for the U.S. move to deploy Sentinel—to "catch up."—but even this motivation has been diminished by additional intelligence on what the Russians really appear to be doing.

In June, arguing for American deployment of the ABM, Sen. Jackson, D-Wash., declared, "We seem to be assuming that Moscow has not deployed an ABM system. They deployed their first system in 1962 around Leningrad. We have not even deployed one as yet. And the lead time is at least five years for the first battery to be ready."

Yet Sen. Hart, D-Mich., and others, have offered an effective refutation to the simplistic thesis that the Russians have an ABM system and we do not.

Said Mr. Hart, "It is clear that the Soviets have not deployed and are not deploying any ABM system which can protect their country against missile attack.

"It is now clear that the Soviet Union's ABM deployment consists of only a small and essentially ineffective deployment around the city of Moscow, using the so-called Galosh missile.

HAVE ABM CAPABILITIES

"Two other systems have been described as having ABM capabilities; one, deployed at the city of Leningrad in the early 1960s, was apparently abandoned when the U.S.S.R. considered it ineffective against the missile threats then in being; the other defense deployment, called the Tallinn system, after the city of Tallinn where one of the sites was first identified, was for a time considered to have a possible ABM capability.

"By February 1968, however, it was apparent that the Tallinn system does not now have, nor did it ever have, an antiballistic missile capability."

Sen. Jackson has conceded that, "the majority view in the intelligence community—it is not the unanimous view—is that the Russian system is designed primarily as a defense against air-breathing missiles and aeronautical devices (including aircraft) as opposed to a missile defense."

In a letter to former Sen. Monroney, D-Okla., urging a delay in U.S. ABM deployment, Roswell Gilpatric, former deputy secretary of defense, commented, "It seems generally accepted within our intelligence and scientific community that the ABM system which the Soviets have deployed around Moscow has encountered many technical difficulties and is probably of limited effectiveness.

"Since the Soviets have always excelled in defensive systems, it is reasonable to believe that the ABM problems with which they have been afflicted will, in due course, face our scientists.

"If so, more research and development effort should be expended by the United States before any go-ahead on deployment is given . . ."

Editor John W. R. Taylor wrote in the 1968–69 edition of "Jane's All the World's Aircraft": "The Tallinn defense system being set up across the northwest approaches to the Soviet Union is intended to deal with aircraft, rather than missiles."

THE CASE AGAINST ABM—XI: WHAT DID MCNAMARA MEAN BY "MARGINAL"?

(By Everett S. Allen)

WASHINGTON.—When former Defense Secretary McNamara reversed a several-year-old stand in 1967 and called for deployment of a "thin" ABM system to defend us against Communist Chinese missiles, he described his decision to do so as "marginal."

The interpretations of what McNamara meant by "marginal," as offered by pro and anti-deployment forces are as far apart as the forces themselves.

A pro-deployment Pentagon official, who declined to be identified, and who said he participated in the conversations that preceded McNamara's decision, commented, "I am certain that in his use of the word, Mr. McNamara did not refer to doubts about the Sentinel system's effectiveness in protecting us against the Chinese threat, but rather, to the fact that there was a marginal question as to whether the Chinese leadership would be sufficiently irrational as to attack us."

CONTRARY EVIDENCE

However, there is contrary evidence that McNamara did have continuing doubts about the ABM's effectiveness and that probably he was at least including this doubt in his use of the word "marginal" if, in fact, he was not referring to the effectiveness exclusively.

In an introduction to a report on the missile shield controversy made public this month by the Center for the Study of Democratic Institutions, a nonprofit educational group, former Vice President Humphrey commented: "I have always been skeptical in my own mind about the security value of deploying an ABM system . . . I share the reservations stated by Secretary McNamara when he announced the ABM deployment in 1967."

Sen. Young, D-Ohio, recalled, "McNamara brought down on his head the wrath of the leaders of the military-industrial complex and the Joint Chiefs of Staff who were calling for a heavy ABM shield, so-called, when he stated that such a continuing expenditure would provide no adequate protection whatever against a Soviet nuclear attack.

"He stated that adding more billions to the billions already wasted in ringing our cities with ABMs furnished only a strong inducement for the Soviet to vastly increase their own offensive forces. Then we would respond and an arms race would rush hopelessly on, to no sensible purpose for either side.

"That was the wise conclusion of our then secretary of defense.

MADE CONCESSION

"When I listened to Secretary McNamara concede agreement to a thin system as a defense against a possible missile attack from China in 1978, or thereafter, I knew in my own mind he had made this concession and compromise against his better judgement.

"I attended a conference attended by a number of my associates in the Senate and there was ample basis for my conclusion."

Dr. George W. Rathjens was, until June 1968 director of the Systems Evaluation Division of the Institute for Defense Analyses; he now is an MIT professor of political science.

In his study, "The Future of the Strategic Arms Race," published under sponsorship of the Carnegie Endowment for International Peace this month, Dr. Rathjens notes that:

"In announcing the Sentinel decision former Secretary of Defense McNamara made it clear that he regarded the decision as marginal . . .

"Subsequently, other Johnson administration spokesmen claimed the system could deny damage to the United States from a Chinese nuclear attack. However, to have high confidence in the system one must allay doubts of three kinds:

"1. The question of whether such a complicated system will work at all when called upon to do so . . . while component tests will be possible, it will never be feasible to test the full system against a satisfactory simulation of an operational environment.

"This fact, with the history of initial failures of far less complicated systems, leads many experts to believe that the probability of a catastrophic failure of Sentinel, or any other ABM system is high.

"COULD DEFEAT SYSTEM

"2. The possibility that the Chinese may develop penetration aid that could defeat the system. This possibility is discussed at some length by Richard Garwin and Hans Bethe (summarized earlier in this series). I am not aware of any convincing rebuttal of their thesis.

"Gen. A. W. Betts, chief of research and development for the Army, in replying to the Garwin-Bethe argument, disputes the contention that development of effective penetration aids would be as easy as claimed. To make his point, he cites American difficulties in developing high-confidence penetration aids. There are, however, two considerations that make this experience largely irrelevant:

"Our program aims at the development of penetration aids effective not only against exoatmospheric defenses, but also against terminal interception. If one has to cope only with the former, which is all that is required in the case of Sentinel, the problem is much less complex.

"Second although the Chinese would probably prefer to have a high-confidence system as a deterrent against the United States, one with a moderate probability of penetrating the Sentinel defenses might be almost as useful to them."

DEMANDING TASK

"3. Damage denial is a much more demanding task than simply reducing damage by small amounts . . . Let it be assumed that a given target is defended by 50 interceptors; that the Chinese have 25 ICBMs with a reliability of 80 per cent, and that each interceptor has on 80 per cent chance of destroying an ICBM. According to this scenario, there is no more than about a 50 per cent probability that Sentinel would succeed in preventing all 25 ICBMs from hitting their target.

"The range of the Spartan interceptor, which is used with the Sentinel system, implies that not 50 interceptors, but about 500, would have to be deployed throughout the United States if every important target were to be within the effective defensive range of 50 Spartan missiles (since the offense can choose any target on which to concentrate his attack and the defender must defend all targets.)

"Thus, even with a 20-to-1 superiority in the number of interceptors over the number of Chinese missiles, the picture is far from comforting.

"When one considers that a single one-megaton warhead detonated over one of the larger U.S. cities would produce about 1 million fatalities, it is clear that those who claim damage-denial or near damage-denial capability for Sentinel are assuming an extraordinary high level of effectiveness."

Twenty-three prominent Americans are listed in the preface to Dr. Rathjen's study and the author comments, "the following persons, who have read the paper and participated in all or part of the discussions, were generally agreed that it presents fairly the facts . . ."

One of the 23 was Robert S. McNamara, former secretary of defense.

THE CASE AGAINST ABM—XII: WHAT ARE THE PROSPECTS FOR ABM?

(By Everett S. Allen)

WASHINGTON.—If the Nixon administration does not press for continuing ABM deployment, construction of the Sentinel system may stop permanently, principally because selection of the first three battery sites has made it an issue at the Main Street level.

Congressional opponents of deployment now find their case buttressed by sacks of opposition mail from the voters, whose anxiety over a "bomb in the backyard" already has prompted important federal action, favorable to antideployment forces.

In a letter to Republican Sen. Cooper of Kentucky, Sen. Stennis, D-Miss., new chairman of the Senate Armed Services Committee, has agreed to the former's request to allow "outside" witnesses to testify on the ABM in open hearings before the committee.

These witnesses will include some of the top-level educators and scientists, including the four former science advisers to U.S. Presidents, who have been outspoken in their opposition to ABM.

AWAITS NIXON'S MOVE

Second, Chairman Rivers, D-S.C., chairman of the House Armed Services Committee, in a letter to Defense Secretary Laird, has said, in effect that, because of the rising controversy, his committee will take no action to approve Sentinel sites until the Nixon administration positively expresses an interest in the project.

Laird's reaction to the rising opposition has been to order a halt in ABM work pending an upper-echelon review of the program.

This was precisely what was called for on Jan. 31 in a letter to Laird from Sen. Kennedy, D-Mass., Democratic whip, who wants a congressional debate on continuation of deployment.

Another factor impelling members of Congress to join the anti-ABM ranks stems from the conversation that Sens. Gore, D-Tenn., and Pell, D-R.I., had with Soviet Premier Kosygin last November in Moscow.

In their report to the Senate, they said, "It seems clear to us that the Soviets are interested in beginning talks on limiting offensive and defensive missiles . . ."

MODERATE VOICE

Sen. Brooke, R-Mass., mentioned this as one of the reasons for his opposition to ABM. As a new member of the Armed Services Committee, Brooke is expected to add a more moderate tone to the group that traditionally favors erring on the side of greater military spending.

Brooke's anti-ABM thinking, shared by many of his colleagues, is based on the belief that we cannot construct an effective system: it is far better to try to get Russia to come to some agreement to limit nuclear weapons, and finally, that an $80 billion defense budget is too high, considering the nation's many domestic needs.

"Aren't we really talking about a $40-$50-billion program, rather than simply the expenditure of $5.5 billion, the figure that has been used?" he was asked by The Standard-Times.

"Experience shows that's the kind of thing that happens," he replied. He added that he had found former Defense Secretary McNamara's decision to deploy "quite a surprise and a disappointment," and said that his votes against ABM had been cast "only after research in depth and consultation with MIT scientists."

FUNDAMENTAL ISSUE

Sen. Kennedy, also among the leaders of the anti-ABM group, called the deployment issue a "matter of fundamental importance," citing the enormous cost factor and the fact that "there is always a question of where we are with regard to security" even if we do build such a system.

He noted that a total system cost of $65 billion had been suggested, and concluded:

"With $65 billion, we could educate every child, unpollute every river, and rebuild every city."

Democratic Senate Leader Mansfield also echoed a growing congressional view when he said, "Usually the Defense Department just has to ask for what it wants, and we give it to them. Last year, for the first time, we questioned the department on various subjects . . . and that time was long overdue."

As of Jan. 31, a Sentinel Systems Command official was willing to guess privately that 48 members of the Senate were opposed to ABM deployment. If this is accurate, it represents a sharp rise in the anti-ABM ranks.

Last year, Senate deployment opponents picked up 10 votes between the first vote April 18—a move to refuse procurement funds—and the Aug. 1 vote on whether to deny construction appropriations. On the April 18 vote, 24 senators went on record gainst the ABM. On Aug. 1, 34 senators did so—one-third of the membership.

No House rollcall votes on the issue were taken during this period, but on non-record votes, House members upheld ABM funds by a 3-to-1 margin. Rivers' letter to Laird suggests an important erosion of this House margin.

MORE CONSERVATIVE

On Jan. 31, leaders of the Senate anti-ABM effort were slightly more conservative than the Army in estimating their strength. A senator's aide suggested they had 13 Republicans and 26 Democrats, with at least four more—Eagleton, D-Mo.; Cook, R-Ky.; Packwood, R-Ore., and Harris, D-Okla., "leaning our way."

This represents a considerable gain in view of the fact that last year the total of 34 ABM opponents dropped to 25 in the wake of the Russian invasion of Czechoslovakia.

What will the administration do?

Defense Secretary Laird is not opposed to ABM systems in principle. As spokesman for GOP members of the House Defense Appropriations Committee in 1966, he declared critically that a "flaw in the present American strategy is the lack of aggressiveness in the development of an ABM defense system."

On Jan. 30, Laird said the United States, by moving ahead with the Sentine system, would strengthen its bargaining position in possible talks with the Soviet Union on limiting missiles.

FELT M'NAMARA ERRED

Yet sources close to Laird indicate he felt McNamara made a mistake in deploying a "thin," possibly obsolete system as opposed to a more advanced "thick" ABM system such as more research and development might make possible. Thus, the defense secretary might be willing to suspend Sentinel deployment.

Further, although President Nixon came out strongly for deployment of the Sentinel before his election, he is said not to be irrevocably committed to the ABM concept.

In part, this may reflect the fact that former President Eisenhower is not convinced of ABM's worth, and opposed its deployment.

There appears a very reasonable chance that the administration will choose not to continue deployment of the ABM system at this time, and the overwhelming weight of evidence indicates this is the course the nation should follow.

[From the Congressional Record, Feb. 7, 1969]

Study Evaluating Certain Military Contracts and Procurement Procedures

Mr. FULBRIGHT. Mr. President, 2 weeks ago the public was informed of a study evaluating certain military contracts and procurement procedures. The paper, entitled "Improving the Acquisition Process for High-Risk Military Electronic Systems," was written by Mr. Richard A. Stubbing while attending Princeton University under the terms of a scholarship which he received for his performance as an official at the Bureau of the Budget.

After receiving a copy of this report in classified form from the Department of Defense, I received a substantially identical copy from the Bureau of the Budget which is unclassified.

The only difference is the deletion, in a chart of the unclassified version, of the names of two contracting companies—firms which are identified as General Dynamics and North American Aviation in an article appearing in the Washington Post of January 26, 1969.

This inconsistency accounts for some of the public confusion regarding the status of the document and is one more example of how a Government agency takes steps to restrict the distribution of information which is embarrassing to it. I am at a loss to understand how officials in the Department of Defense took it upon themselves to classify a document submitted by a scholar, who has absolutely no affiliation with the Pentagon, as a research project based totally on public documents.

Mr. President, in order to correct any confusion regarding the availability of this document I ask unanimous consent that it be placed in the Record at this point, along with an article by Bernard Nossiter in the Washington Post of January 26, 1969. [See page 48]

There being no objection, the document and article were ordered to be printed in the Record, as follows:

"Improving the Acquisition Process for High Risk Electronics Systems

(By Richard A. Stubbing)

"The attached paper entitled "Improving the Acquisition Process for High Risk Military Electronics Systems" was prepared to satisfy a course requirement while the author was in attendance at Princeton University in the 1967–68 school year. In the context of the course, the purpose of the paper was to explore quantitative approaches to a variety of problems. This paper has been on file in the Woodrow Wilson School at Princeton University since last May.

"The following cautions should be observed in reading the paper: (1) In an effort to simplify the approach to a complex problem on an unclassified basis, the assessment of the performance of a weapons system was reduced to the single parameter of Mean Time Between Failure (MTBF) which measures continuous running hours. While MTBF is clearly an important factor, it is not the only one, and MTBF as a common denominator presents certain problems in comparisons of different electronics systems. (2) The primacy of return on net worth over that of profit on sales in evaluating corporate profitability advocated in the paper is a matter of some dispute in the financial and business community.

"A growing and prosperous nation can afford many luxuries, but the low overall performance of electronics in major weapon systems developed and produced in the last decade should give pause to even the most outspoken advocates of military hardware programs. A sample of 13 major Air Force/Navy aircraft and missile programs with sophisticated electronic systems initiated since 1955 at a total cost of $40 billion, reveals the following overall performance:

"[In billions]

	Total program cost
Canceled (2 programs)	$2
3-year operational life (phased out for low reliability; 2 programs)	10
Poor performances, electronics reliability less than 75 percent of initial specifications (5 programs)	13
Satisfactory performances, electronics reliability over 75 percent of initial specifications (4 programs)	15

"Less than 40% of the effort produced systems with acceptable electronic performance—an uninspiring record that loses further lustre when cost overruns and schedule delays are also evaluated.

"What course of action can be offered to improve electronic system performance in future new weapon systems? In an attempt to answer this question, this paper will analyze the characteristics and results of recent large scale electronic systems developed for missile and aircraft programs. Actual program histories are documented, alternative procedures involving non-competitive and competitive situations are compared, and specific proposals involving greater use of competitive contractor developments are advanced for all future complex electronics systems.

"GENERAL BACKGROUND

"Electronics systems. Most World War II aircraft were equipped with basic electronic equipment for navigation and communication needs. The introduction of airborne radar late in the war for identification of hostile aircraft was the first major advance in airborne electronics equipment. The second and even more important breakthrough was the introduction of the computer into the aircraft avionics system for improved navigation and to serve as an automated fire control system for both air combat and bombing missions. Every major aircraft system introduced since World War II features both radar and computer systems for improving air combat capability and for delivering ordnance with greater accuracy against targets under all-weather conditions. Also, each successive generation of guided missiles contains the latest in computer technology designed to increase the delivery accuracy of its nuclear warhead.

"To provide the reader with some feel for the growth in complexity of electronics systems over this period, the following data is provided:

"Comparative unit costs of electronic systems for aircraft and missile systems over time

"Operational date:	*Cost* [1]
1955 aircraft electronics	X
1957 aircraft electronics	2X
1960 aircraft electronics	5X
1962 missile electronics	8X
1964 aircraft electronics	6X
1966 missile electronics	10X
1967 aircraft electronics	15X

[1] C. Teng. An Estimating Relationship for Fighter/Interceptor Avionic System Procurement Cost, Rand Corporation RM-4851, 1966, p. 13.

COMPARATIVE COMPLEXITY OF MILITARY VERSUS COMMERCIAL DEVELOPMENT PROGRAMS IN THE 1950's [1]

	State of the art exploitation	Relative technical difficulty
Military weapon systems:		
10 guided missile systems	High risk	High risk.
3 airplane systems	do	Do.
Commercial systems:		
4 electronic systems	Medium risk	Low risk.
2 atomic reactors	do	Do.
3 motor vehicles	Low risk	Do.

[1] Merton J. Peck, and Frederic M. Scherer, "The Weapons Acquisition Process," 1962, pp. 290-291.

"Aircraft and missile systems of the 1950's consistently attempt greater state of the art advances and face greater technical uncertainty than comparable commercial systems. Available cost data points up the significant increases in electronic systems unit costs over the past decade.

"For purposes of this paper the degree of risk or uncertainty connected with each new electronics system for a major weapon system will be defined as follows:

"Low risk—a system in which the entire set of hardware has been previously demonstrated as an entity in some prior program.

"Medium risk—a system in which each of the major components (radar, computer, displays) has been successfully demonstrated in advance, but the separate components have never been integrated into a single system.

"High risk—a system in which at least one major component must be redesigned. The radar, computer and related circuitry are the heart of each electronic system, and redesign in this area reflects the very highest degree of uncertainty as regards expected performance.

"Finally, a definition of performance is required. Performance in every system will be measured in only one parameter—the mean time between failure of the electronic system (MTBF). This criteria reflects the continuous hours of operation reliability of the aircraft or missile electronics system between unscheduled failures. For comparison purposes every system has both a design specification MTBF drawn up when the program is launched and actual operational data reported in terms of MTBF after the system is deployed. The ability of a weapon system with all electronics working to achieve specified ordnance or warhead delivery accuracies is not separately addressed, but it should be noted that deficiencies of this nature will only accentuate the differential between MTBF design and actual performance data.

"CONTRACTOR SELECTION PROCESS

"Major weapons systems are procured from the aerospace industry, a group of some 60 companies with total 1966 sales of $24.2 billion, of which some 81% or about $20 billion were to the federal government—primarily DOD, NASA, AEC.[1] Included in this group are the end product producers of aircraft and missiles (Boeing, McDonnell/Douglas, Grumman, General Dynamics, LTV) and major sub-system producers of engines and electronic systems (GE, North American, Westinghouse, Sperry Rand).

"A recent Rand study provides some data on the profitability of the aerospace industry compared with other industries over the period 1957–1964:[1]

PERCENT RATES OF RETURN IN 10 INDUSTRY GROUPS (1957-64)

	Net worth	Sales
Drugs	16.1	9.4
Aerospace	15.6	2.6
Autos	14.7	6.5
Chemicals	14.0	11.4
Office machinery	14.0	7.3
Electrical machinery	11.9	4.4
Petroleum	11.4	9.9
Food	10.7	2.3
Steel	8.4	6.3
Textiles	7.8	4.6

"Of the major U.S. industries, aerospace ranks *second* in return on net worth, a measure which provides a meaningful relationship between resources utilized and profits generated. While the low aerospace profit on sales is often cited by those who view aerospace profits as inadequate, this return does not relate input and output and has little economic value. The question of whether aerospace contract performance justified this high return on net worth will be considered later in light of the avionics systems developed over this period.

"The weapons acquisition process is initiated when the service determines a requirement for a new aircraft or missile with certain operational capabilities. Following Secretary of Defense approval the service issues Request for Proposals (RFP's) to various prime contractors inviting each to deline a possible operational system. Interested prime contractors (in almost all cases an aircraft manufacturer) then forms teams with potential subcontractors—notably engines and electronics in the case of major aircraft or missile programs. These contractor teams then jointly develop a technical proposal which they feel can meet the system specifications and the time schedule restraints laid down by the potential customer. Rough contractor cost estimates also accompany each bid. At this point it is important to note that interested contractors submit proposals singularly high optimism as regards schedules, cost and performance. Spectacular advances in electronic performance are always promised; at the same time uncertainties are minimized as each contractor team recognizes that each new development program represents some 10–15 years potential business heavily weighted toward high margin follow-on production contracts. Peck and Scherer conclude that R & R efforts constitute 20–25% of total weapon system costs.[3]

"These design proposals are then forwarded to a Source Selection Board (SSB) convened expressly to select the best contractor team for the new system. Prior to 1963 these boards selected a single contractor to undertake the proposed program; commencing in 1963 a Contractor Definition Phase (CDP) was added in which the SSB selects the 2–3 most promising proposals and funds an extensive 12–18 month follow on effort for each designed to better define the risks and technical feasibility of each proposal before a final selection is made. These detailed proposals are then reevaluated and the contract award is made. Prior to 1960, the initial contract was CPFF in nature, while in recent years incentive type contracts reflecting cost, schedule and performance milestones have been awarded. In connection with these awards, two points should be noted:

"1. The final selection under either procedure is made on the basis of a paper design—no prototype system is in sight prior to the selection of a contractor.

"2. Deluged with paper work from each bidder the SSB is in large measure dependent upon the technical expertise of the contractor team in evaluating each proposal.

"Turning to the electronics portion of each new weapon system, it is not surprising that in almost every instance a high risk proposal involving new or modified computers and radars is advanced. The rationale is simple: why submit a proposal which uses currently available electronics on a future generation weapon system? Each contractor wants his proposal to be the most attractive; operational performance is rated much more highly than cost savings, and the contractor understandably desires the added sales volume from designing and developing new electronics equipment rather than integrating available "off the shelf" equipment. Finally, in the electronics area the winning subcontractor inevitably "locks on" to more business than is ever contemplated when the original award is made. Under current procedures a single electronics subcontractor is retained for the entire life of the program. Every major weapon system today uses several generations of electronics equipment over its lifetime as evidenced by 4 different electronics systems for a recent tactical aircraft and 3 systems for a current missile system.

"Why no electronics competition after the final airframe contractor is selected? In development programs, the answers to this question deal with the large costs associated with parallel contractor efforts, the delayed operational deployment and attendant "military risk" and the difficulty of integrating alternate electronics into a single weapon system. No mention is made of the potential for reducing risk and increasing performance from parallel competitive efforts. For follow-on production contracts again no competition is sought; the arguments now become those of non-interference with tightly established schedules and the added tooling expense required to qualify a second source contractor. The only competition which currently exists after a contract award is of the indirect variety involving the choice of an alternative weapon system as a substitute for or supplement to a weapon system currently under contract. However, given the 4–7 year lead time required to develop and produce a new weapon system, the probability of substitution between major systems is not great.

"EVALUATION OF RECENT ELECTRONICS SYSTEMS

"The following section draws heavily on several Rand studies and on the work of Peck and Scherer in analyzing available cost, schedule and performance data on electronic systems designed and developed from World War II until 1960. A later section will review electronics after 1960.

"Radars (1943–57): Marschak compares the development of airborne radars during World War II with those developed in the 1947–57 period.[4] Four wartime radars were developed on a flexible basis starting with a general mission requirement but no detailed specifications; emphasis was placed on prototype flight testing in an operational environment *before* production commitment. Three postwar radars, by contrast, followed an inflexible approach with schedules and specifications determined in advance and production commitment initiated prior to the first flight tests. From the standpoint of technical risk there was little difference between the periods; if anything the postwar radars were less risky.

"The comparative results of these programs were startling. In constant dollars the development cost of the less risky postwar radars was almost double that of the earlier systems. World War II radars were in operational use within two years from "go ahead" and showed high performance reliability, while the postwar radars took 4–7 years to achieve operational capability and proved unsatisfactory in meeting performance specifications. Also, due to the early production commitment the correction of flight test faults in postwar radars proved difficult and expensive. On balance, the performance of the flexible specifications approach to radar development utilized during the war was far superior to the postwar approach with predetermined specifications.

"Electronic systems (1945–60): For an excellent overview from the standpoint of cost on weapons systems deployed in this period, A. W. Marshall and W. H. Meckling presented in 1962 the results of their analysis of 22 major systems.[5] Original cost estimates are compared with actual costs incurred for each system, adjusted for constant dollars and changes in production quantities. An actual cost factor based on 1.0 for the original cost estimate is then calculated for each system and then categorized according to degree of technical advance:

COST FACTORS BY WEAPON SYSTEM [1]

Small risk		Medium risk		High risk	
Cargo aircraft	1.6	Bomber	2.8	Missile	7.0
Do	1.5	Fighter	2.5	do	6.4
Do	.9	do	2.0	do	6.0
Do	.8	do	1.2	do	2.7
Fighter	2.0	do	.6	do	.8
Do	1.5	Missile	1.3	Bomber	4.0
				Do	1.2
				Fighter	4.0
				Do	1.0
				Do	.8
Arithmetic mean	1.4		1.7		3.4

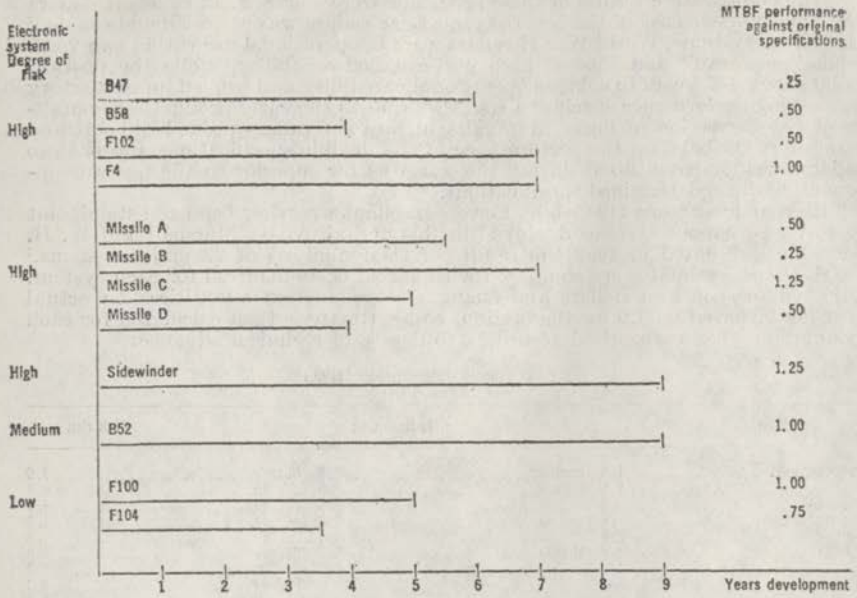
[1] Ibid p. 472.

"While this data is presented in terms of complete weapon systems, their high correlation with the electronics systems can be demonstrated. In the high risk programs characterized by cost increases averaging 240% over initial estimates, the largest cost increases are in missile development, which during this period advanced into a new and radically different technology involving computers and other electronic equipment capable of solving complex guidance and control problems without human assistance. System reliability in MTBF was aimed at an order of magnitude improvement over anything achieved before.[6] Bomber and fighter aircraft with large cost increases in this period also involved high risk electronic programs and experienced increases of over 100% in cost. By contrast, the four cargo and tanker aircraft which have much less stringent avionics requirements and normally rely upon already existing electronics show a low increase of only 20% over original cost estimates.

"In a related effort which is not as well documented Marshall and Meckling examined 10 weapon systems on which data was available for delays in scheduled availability. Their data showed an average slippage of 2 years or 50% between the forecast and actual operational deployment of the complete weapon system.[7] Again, the systems with high risk electronics can be assumed to be among those with the higher schedule slippages.

The operational performance of electronic systems over this period will now be scrutinized. Again, performance will be measured in terms of original estimates vs. actual operational data using the criteria of MTBF. For simplicity the MTBF performance of each system in its first year of deployment will be grouped in quartiles—thus 12–37% will be listed as .25, .38–.63% as .50 etc. The following chart portrays the degree of risk (based on the earlier definitions) and total development time for electronics in 12 weapons systems deployed in the 1950–60 period compared with the first year's MTBF performance for each system:

CHART I.—RISK, DEVELOPMENT TIME, AND OPERATIONAL PERFORMANCE IN AIRBORNE WEAPON SYSTEMS



"Although the sample is limited Table I highlights the inverse relationship between risk and performance in these systems. Of the 9 high risk programs six were far below expectations while Sidewinder, one of the high performers, benefitted from a leisurely 9 year development program. Excluding Sidewinder, the average MTBF of the 8 high risk programs is slightly over half of the original specifications.

"Pertinent information on some of these 12 systems follows:

"B47—the first jet bomber. Developed on a leisurely schedule from 1944 until 1949, then accelerated rapidly and deployed in 1950. An interim fire control system had to be substituted for a new avionics development that failed completely; the bombing system was so unreliable as almost to destroy the usefulness of the plane as a bomber.[8] The B52, developed on a more leisurely nine year basis, benefitted from the B47 experience.

"F102—Delta wing interceptor for Air Defense Command. Original fire control system beset with continuing delays and had to be replaced with an interim electronics system. Initial operational tests revealed this interim fire control system was unsatisfactory and an extensive modification and retrofit program over the next two years was required to remedy the defects.

"F4—A supersonic interceptor for the Navy and Marines. This is the one program over the period in which the weapon system was chosen on the basis of a prototype competition. Competitive prototype flight testing of the McDonnell F4 against the Chance-Vaught F8 in 1957 showed the F4 to be a superior aircraft and the production contract was awarded to McDonnell. The F4 electronic system was high risk—involving both a new radar and a new computer and its operational performance met specifications. The competitive prototype demonstration identified performance difficulties at an early stage, allowing sufficient correction time for fixes prior to delivery of production aircraft.

"Missiles A, B, C. All high risk programs developed under crash schedules aimed at earliest possible deployment. Funds were unlimited and extreme concurrence (overlap of R&D and production) was practiced. The systems were operational on time; their MTBF performance, however, was very low on two systems and very high on the third.

"Sidewinder—A heat sensing missile for air combat. A high risk program that had excellent results. Benefitted from the absence of crash schedules and successfully utilized the technique of exploring parallel approaches to certain key components with different contractors—each of whom had high expectations of a large production contract should his approach prove more successful.[9]

"F100—A supersonic fighter bomber. The contractor deliberately chose a low risk, inexpensive, electronics system to minimize development time. The aircraft was deployed 4.5 years after contract award and the avionics MTBF met expectations.

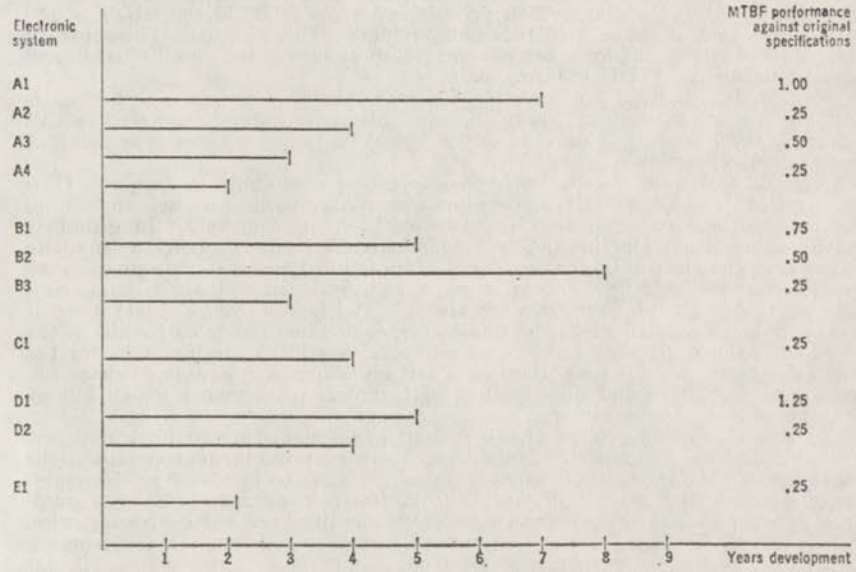
"F104—A supersonic fighter bomber. Successful development in under four years featured rapid flight testing of two prototype aircraft before commitment to production. A low risk electronics system was used in this aircraft.

"Coupling the low operational performance of high risk airborne electronics with scheduling delays averaging two years and cost increases of 100–240% leads to the incomplete by nevertheless important conclusion that the electronics acquisition process in the 1950's suffered great deficiencies.

"Electronic systems (1960–70): Have the electronic systems demonstrated improvement in the 1960's? The answer to date is a categorical 'no'—in fact, the results already in clearly indicate a retrogression in electronics performance along with a telescoping of development schedules and continued large cost overruns.

"For purposes of analysis this section deals with 11 high risk airborne electronics programs designed in the last ten years for five recent weapon systems. Second and third generation electronics for a single weapon system are separately identified. Two systems involving about $2 billion in sunk cost which were cancelled during this period for poor technical performance were not included in the study sample. For security reasons the weapon systems will be coded A, B, C, D, E while successive electronic suits for a single weapon system will be identified A–1, A–2, etc. The following table identifies the risk, development time and first year MTBF performance for each of the electronics systems:

CHART II.—HIGH RISK ELECTRONICS PROGRAMS, DEVELOPMENT TIME, AND MTBF PERFORMANCE



"Table II discloses that these most recent high risk avionics programs have been characterized by sharply reduced development time periods (3–4 years vs. 5–7 years in the 1950's) and have resulted in lower and lower system performance. The eleven high-risk programs analyzed achieved an average MTBF less than 50% of design specifications, which is lower than the average 1950 experience cited earlier. Of special significance, the follow-on programs A–2, A–3, A–4, B–3, D–2, E–2 demonstrate sharply reduced performance from that achieved in the parent program, with an average MTBF only 30% of specifications.

"Although the 11 high risk avionics systems do not provide a high confidence sample size, a linear regression and correlation analysis comparing system performance with (1) development time period and (2) average production cost for 300 units was run and the results are set forth in Tables III and IV (not printed in RECORD).

"From Table III it should be noted that increased development time has a positive effect on system performance with a correlation coefficient (R) of .50. With a standard deviation of .33, an average development period of 5 years is required to achieve .50 reliability or 7–8 years to attain .75 reliability. In this context, the recent trend toward shorter (3–4 year) development periods is a step in the wrong direction to upgrade reliability.

"Table IV compares electronics performance with average production cost and the negative linear regression line demonstrates that the more expensive (and complex) electronics systems result in lower system performance. While the coefficient correlation R=.42 is not highly significant for extrapolation purposes from this small sample, the trend toward lower performance with higher cost systems is borne out.

"A closer look at some of the individual weapons follows:

"System A. The A1 electronics were developed and flight tested on a relaxed schedule for the entire weapon system prior to ordering production aircraft. While each of the follow-on programs (A2, A3, A4) called for redesign of major components with a high degree of uncertainty, each was brought in on a "pressure cooker" basis with large quantities of production electronics sets on order prior to initial prototype flight testing of the new equipment. The results of this compressed effort were predictable: flight tests revealed unsuspected faults, costs soared as crash modifications and "fixed" were added to production line systems, and the MTBF of operational equipment fell to well under 50% of specifications. Each of the follow-on systems was developed by the initial System A electronics contractor.

"System B. The B1 electronics were developed on the same schedule as the entire weapon system and, while involving some high risk equipment, were not considered one of the pacing areas to the attainment of scheduled deployment. The equipment performed well in prototype testing while in the hands of the contractor team of skilled scientists and engineers. This equipment, however, in the hands of service maintenance personnel and under combat conditions showed a rapid decline in MTBF performance.

"System B2 involved a completely different mission with another electronics suit for Weapon System B. Many technical obstacles were encountered in this program, resulting in a tripling of development costs and a three year delay in operational deployment.

"The B3 follow-on electronics is an interesting case study in that the Contractor Definition Phase (CDP) procedure was utilized to choose a new electronics contractor. The Source Selection Board gave a 12 month contract to three finalists in the competition for this highly sophisticated system involving a complete redesign of the electronics for System A. The detailed contractor proposals were evaluated and a fixed price incentive contract was signed with the winning contractor. In less than a year from 'go ahead,' (and before even a single piece of hardware had been delivered) the total contract had doubled in cost while at the same time the contractor was permitted to relax critical specifications for the new electronics. In this case, the new CDP procedure was unable to deter the usual cost escalation and downgrading of technical performance which follows selection of a single contractor.

"System C. The electronics of this system was designed for sophisticated performance and was successfully demonstrated using contractor personnel, but the reliability of the electronics in operational aircraft in the hands of service maintenance personnel again fell off sharply from design specifications. A large modification program followed to correct some of the identified performance deficiencies.

"System D. This is an instance of high performance and then low performance by a single contractor on successive electronics suits for a single system. The D1 system was deployed within five years and exceeded all specifications under operational conditions. The D2 system was developed in a shorter time period with a complete package redesign involving new computers and circuitry which encountered major technical obstacles and resulted in a very low performance when deployed operationally. Again, a massive retrofit program was required to correct glaring deficiencies. Actual development costs were triple original estimates, and were double costs set forth in an incentive contract negotiated one year after the development effort had been initiated.

"AEROSPACE INDUSTRY PROFITABILITY VERSUS PERFORMANCE

"Preceding sections have dealt with the relatively high return on equity for aerospace when compared with other U.S. industries and the declining trend in performance achieved in one important segment of this industry—the develop-

ment and production of complex electronics systems. Is this an anomaly or is there no measurable relationship between profits and performance? This section will briefly analyze this situation.

"In commenting upon the nature of the aerospace industry, Stekler points to its salient features as a high concentration of sales, absence of competition, high entry barriers and inadequate financial incentives on the individual company. He then adds 'one would theorize that the performance of an industry with such a structure would not be outstanding. This, indeed, is the case.' [10]

"In a related vein where development strategies between aerospace projects and commercial ventures are contrasted, Peck and Scherer point out the different sets of values used: in the military, contractors maximize quality at the expense of cost and schedules, whereas in commercial R&D projects the primary emphasis is on costs and time.[11] This quality emphasis in military R&D reflects the desire to hedge all bets by advancing scientific frontiers and maintaining an arsenal of weapons on a parity with or superior to the best technical advances of any potential adversary. Decision makers, however, also are involved in pushing technical advances for their own sake and in catering to the whims of service prestige and scientific bias. J. Robert Oppenheimer described the support of the scientific community for the development of nuclear weapons 'when you see something that is technically sweet you go ahead and do it and you discuss what to do about it only after you have had your technical success.' [12] The preceding highlights the overlap between military neccessity and self-gratification in the selection of advanced weapons systems; actual electronics prformance data emphasizes the low quality against defined goals which the military customer accepts, thereby bringing into question the primacy of strategic goals over those of technical advance for the sake of science.

"The dollar profitability of the aerospace is compared with that of all U.S. industries in Table V (not printed in RECORD) for the period 1957–66. Aerospace, with a high wage structure and a reputation for inefficiency in production techniques,[13] still achieves a 12% greater return on equity than the average of all U.S. industrial firms.[14] In an effort to relate the performance of electronic contractors to profits, the profit trends of two leading contractors have also been plotted.

"Contractor X whose volume is 98% government produced one highly successful military aircraft in the mid 1950's, then became involved in numerous highly complex electronics programs reaching 50% of total sales volume over the last decade with the following box score on six military hardware programs: one met system specifications, one cancelled for technical reasons; four programs with actual MTBF 25% of system specifications. A look at contractor X's profits over this period shows the remarkable fact that average profits were 40% above those of the aerospace industry and 50% above those of all U.S. industries. Only in the last two years does X show a return below that of the aerospace industry but still remains above the all industry average. The correlation of performance with profits is absent in this case.

"Contractor Y had an even poorer performance record. Of 7 weapons systems with complex electronics developed over the period, not a single program measured up to expectations. Electronics reliability was the key deficiency in every case with actual costs 2–3 times original estimates reflecting overruns, schedule delays and modification efforts to improve low system performance. This company also ventured into the development of commercial aircraft in the late 1950's which proved abortive and resulted in major losses in 1960–61. The company today does 100% government work. With this dismal performance record and despite the absence of profits in 1960–61 Company Y shows an average return over the 10 years period above that of all U.S. industries and just below the aerospace industry average. Again, one must conclude that performance has little correlation with profit.

"The above analysis leads to the conclusion that the current special partnership which exists between government and the aerospace industry not only results in a very high incidence of delivered electronics systems with degraded performance, but there is no effective mechanism in existing contractural arrangements to reward or penalize contractor performance. This results in the enigma of contractors X and Y where consistently low performance over the past decade is not reflected in corporate profits.

"A recent statement by the president of a large aerospace firm concerning a highly publicized and technically plagued aircraft epitomizes the confidence in future government volume: "I have no idea how many aircraft (beyond the current contract) will be built, but remember that the B52, originally a single version aircraft, went through *seven* 'growth' designations. [15]

"Why Not Greater Competition?

"Single source contract awards for airborne electronics in the 1950's with CPFF contracts and close government supervision did not produce desired results. Neither did the use in recent years of the contract definition phase and incentive contracts. Available evidence demonstrates that when a single high risk course is pursued two unhappy alternatives must be faced: to accept an inferior product or to incur the large cost of revising or modifying a highly integrated program. One unexplored alternative remains to be tried for electronics systems involving a high degree of uncertainty—greater use of competitive development.

"Competitive development involves the continued funding of at least two qualified contractors at the conclusion of the source selection process to develop and flight test different electronics suits for possible inclusion in a single major weapon system. The key to this process would be the emphasis on flexibility—allowing each contractor freedom to experiment with multiple approaches to the problems of uncertainty which must be overcome. The use of development competition with the prospects of large future production contracts to the winner should invigorate management and stimulate innovation features currently lacking in major weapon systems development competitions which have been described as exercises in optimism and exaggeration. Major areas of uncertainty can be defined in advance and the final evaluation of the contractors should weigh heavily upon their abilities to minimize the risk in these areas either through the successful development of new equipment or the substitution of existing equipment with lesser operational capabilities. With the historical record of consistently low performance following operational deployment, the flight test competition should also place a high value on performance under operational conditions to prove that the equipment design does not require a large corps of engineers and scientists to maintain it.

"Opposition to full scale competition on major systems is built around the arguments that dual development programs will increase program costs, divert scarce resources away from other needed programs and will result in an unacceptable delay in the operational availability of the weapon system. These arguments are expressed diagrammatically below, (not printed in the Record).

"Proponents of single contractor development argue that expenditure rate curve A is preferred to B or C and curve B is preferred to C.

"How well do these arguments stand up in the face of experience? Development competition will increase costs and delay schedules over that of a single contractor program in which *all* of the critical initial predictions turn out correctly. Unfortunately, historical data shows this almost never occurs with unexpected technical obstacles always being encountered causing cost overruns and schedule slippages and moving the actual expenditure rate buildup to A'. Systems are being forced to experience 'unacceptable delays' or to be deployed with extremely low operational performance, thus refuting the schedule and military necessity arguments affered against a stretched out, competitive program for new electronics system. The use of competition in the early phases of development is a deliberate attempt to spend additional resources early to reduce the uncertainty factor prior to the attainment of high expenditure rates (e.g., buildup rate C). This approach builds in longer development times to minimize the unforeseen schedule delays and to improve the operational reliability of the initially deployed systems.

"As regards system reliability the single vs. competitive contractor approach would show the following patterns when comparing system performance with development time periods.

"In Table VI (not printed in the Record) System A using a single contractor would experience a gradual fall off in specified MTBF performance followed by a sharp decline at 4 years when the system becomes operational. After a period of low performance, a series of modifications would be added to improve reliability to a level of .50 by year 8. System B, using a competitive approach, shows a sharp decline from original estimates in the first 2 years as the contestants refine their original estimates of system characteristics. Following the choice of a single contractor after 2 years, there is only a gradual decline in performance until initial deployment at the end of 6 years. Some improvements will be added but their magnitude will be considerably less than in A. Thus, the trade offs come down to a low performance electronics systems after 4 years requiring large modifications versus a higher performance system after 6 years involving few modifications.

"Only fragmentary empirical evidence exists as to the effectiveness of competitive developments of electronics systems. The case of the F4 where prototype

aircraft were flown and evaluated prior to the award of a production contract is the only instance of this type competition in recent years. The results in this case were excellent with the aircraft and electronics performance meeting system specifications.

"On a related front, the introduction of a second source into the electronics for the Bullpup and Sidewinder missiles had beneficial results. Technical uncertainty had been resolved before a second source was invited to bid, but the electronics (which constitute 80% of total missile cost) dropped 50% for Bullpup and 70% for Sidewinder when two companies presented sealed bids for missile production contracts. To this experience can be added Secretary McNamara's oft stated claim that savings of 25% are achieved when a non-competitive contract is awarded competitively.

"CONCLUSIONS

"The recent trend in airborne military electronic programs has been toward highly complex, crash programs with established technical parameters almost impossible of attainment. Costs swell rapidly from original estimates; schedules slide to the right and the reliability of operational equipment in the hands of service personnel degrades rapidly from that called for in the original design.

"Analysis of the actual program data in the 1944–1960 period with electronics equipment reveals that cost increases and schedule delays vary directly with the degree of risk associated with the program. Cargo aircraft, the F100 and F104, which used existing low risk equipment performed well. Systems of increasing complexity, however, requiring new radars, computers or circuitry experienced cost overruns of 200–300%, schedule delays averaging 2 years and most importantly, low performance when the operational system was deployed. Available data on the few successful high risk electronics programs deployed in this period showed them to be either highly flexible programs with no preconceived parameters of system performance (World War II radars, Sidewinder) or to have benefited from early prototype flight testing prior to production (F4).

"The data collected on more recent electronic systems is limited to high risk programs and reinforces conclusions from the early studies on cost increases and low system performance. Limited correlation analysis points to the need for 7–10 year development period before high reliability systems can be assured and to the inverse relationship between system performance and electronics production costs. Another significant observation is the direct relationship between short development periods (2–4 years) and poor system performance in follow-on electronics programs. The need for prototype flight test data prior to production commitment is highlighted by the major modification and retrofit programs initiated after the fact to correct development fight test deficiencies in operational aircraft.

"One specific area of needed improvement is the current contractor selection process which relies primarily on the evaluation of paper estimates in the selection of major electronics contractors, and then awards follow-on electronics for the weapon system to the same contractor on a non-competitive basis. This need is further demonstrated by the trend in recent years toward a buyer's market as a smaller number of major weapons systems have been initiated while the number of qualified sellers is increasing in the electronics market. The government, however, has not taken advantage of this potentially more competitive market condition and the producers of inferior equipment lacking financial incentives to better performance continue to earn a high profit return.

"Competitive development of high risk electronics systems offers the best prospect of imposing maximum incentives on management and improving the quality and cost of the final delivered product. The earliest possible reduction of uncertainty through the exploration of multiple approaches to system design is the main feature of this approach. Emphasis on the relative case of maintenance at the operational level is another key factor in the final evaluation of alternate configurations. By implication, the use of competitive development would have the advantage of substituting achievable system performance and cost criteria for the 'pie in the sky' promises which have been made in the past on airborne electronic systems.

"RECOMMENDATIONS

"New policy guidelines are required for the acquisition of future airborne electronics systems and should be based on the following two principles:

"1. When early operational deployment (less than 5 years after "go ahead") is the major objective, then the electronics equipment should be limited to that which can be obtained with high certainty. The F100 and F104 programs successfully applied this technique.

"2. When advance in technical capability is the primary objective, a minimum development period of 5–7 years and the institution of competitive development thru prototype flight test should be required for both first generation and follow-on electronics programs for a single weapon system.

"Adding flesh to the second proposal, the following checklist is recommended for all high-risk electronics programs:

"(a) Provide broad descriptions of electronics system requirements in the RFP. (E.g., the end item, weapon system, the radar dish size, approximate weight and cube of the electronics equipment.)

"(b) Continue use of the Contractor Definition Phase, but assure a variety of approaches to major areas of uncertainty in the choice of CDP contractors.

"(c) Select at least two contractors to enter the development competition, again providing a diversity of viewpoints for resolving technical obstacles. The customer should not issue detailed specifications at this time, but should identify the key risk areas in the new system.

"(d) Provide a funded competitive development of at least two years culminating in an extensive demonstration of prototype equipment in an operational environment with special emphasis on the potential maintainability of the equipment by service personnel.

"(e) Select a final contractor on the basis of comparative performance in each of the identified risk areas and on the overall adaptability of the system to operational conditions.

A final note on systems which are expected to be in procurement for a number of years. Consideration should be given to the tooling up of a second contractor after the system has been completely developed to provide an element of competition in the award of annual requirements. Some proportionate formula would have to be established such that both contractors would receive a minimum level of work, but the lion's share of the production would go to the lowest bidder.

FOOTNOTES

[1] Aerospace Industries Association, Aerospace Facts and Figures 1967, p. 5.
[2] Irving N. Fisher and George R. Hall, Risk and the Aerospace Rate of Return, Rand Corporation RM5440, 1967, p. 6.
[3] Peck and Scherer, op. cit., p. 315.
[4] T. A. Marschak, The Role of Project Histories in the Study of R & D, Rand Corporation, p. 2850, 1964, pp. 5–21.
[5] A. W. Marshall and W. H. Meckling, Predictability of Costs, Time and Success of Development in the Rate and Direction of Inventive Activity, R. R. Nelson (ed.), 1962, pp. 461–47
[6] Ibid., p. 471.
[7] Ibid., p. 473.
[8] Marschak, op. cit., p. 105.
[9] Ibid., p. 112.
[10] Herman O. Stekler, The Structure and Performance of the Aerospace Industry, 1965, p. 159.
[11] Peck and Scherer, op. cit., pp. 293–95.
[12] R. Oppenheimer in Brighter than a Thousand Suns (R. Jungk ed.) 1958, p. 296.
[13] Steckler, op. cit., p. 154.
[14] Fisher and Hall, op. cit., p. 4, Corporate Annual reports, and Economic Report of the President, February 1968, p. 293.
[15] Roger Lewis, General Dynamics Corporation president, remarks at annual stockholders meeting April ,1968.

The Case for Missile Defense, by D. G. Brennan, January 27, 1969

The subject of defense against ballistic missiles probably occupies, in terms of the debate about it, a unique position among strategic issues of the nuclear era. I believe missile defenses have been more intensely debated in the U.S. than any other weapon system selected for deployment, such as the air defense system or the Polaris and Minuteman offensive missile systems, or any arms-control measure adopted to date, including the ban on nuclear tests. In fact, the decision to deploy defenses may well be more important than any other single decision made to date concerning our strategic nuclear forces.

But the published literature of this debate has been strangly one-sided. With few exceptions, and those few mainly confined to journals not noted for their opposition to any weapon system whatever, most of the published articles and editorials relating to ballistic missile defense (BMD for short—sometimes, but not here, denoted ABM) have opposed U.S. deployment of missile defense. For example, there have been three recent articles in *Foreign Affairs* concerned in whole or part with BMD, and all three have opposed U.S. deployment.* In view of the facts that the U.S. Administration clearly supports American deployment of BMD, and that most of the Senior American academic strategists and many prominent students or advocates of arms control favor deployment at least under some conditions, it is odd that such much of the published material is single-mindedly in opposition to BMD.** The present article is an attempt to clarify for a larger audience some of the reasons why many analysts think it entirely reasonable to favor American deployment.

I shall concentrate on considerations relating to a U.S. BMD system intended to have substantial effectiveness against major Soviet attacks, rather than on a so-called "light" or "thin" system intended to be effective only against Chinese or other marginal attacks. Much of the support (both inside and outside the Government) for the original deployment decision for Sentinel came from quarters that believed that the system would eventually have significant capability against large Soviet attacks. It seems likely at this writing that whatever system finally emerges will eventually have such a capability, and therefore it seems appropriate to concentrate the discussion here on the actual policy issues this prospect presents, and not devote space to other issues.

In the next section (II) I shall take up the technical-effectiveness issues and state several positive reasons favoring BMD deployment. Section III provides an examination of certain fundamental problems of deterrence and attempts to show that some of the arguments about deterrence made by some critics of BMD are unsound. Arms-control issues are taken up in Section IV, where it is argued that BMD deployment can contribute positively to traditional objectives of arms control and, in particular, need not lead to a new arms race.

SECTION II

In an important sense, the key issues in the debate about BMD are not technical. The sense is as follows. There are certain estimates generally believed within the community of people who have carried out the U.S. BMD development to characterize the plausible range of technical and economic effectivenses of systems achievable in the near future. These estimates are subject to some controversy. The sense involved is that even if the uncertainty and controversy concerning the prevailing estimates were wholly removed, most of the articulate critics of BMD deployment would remain critical: their objections are rooted in other concerns, which I shall discuss below.

On the other hand, there is an important sense in which technical issues are vital to the debate, namely that most of the support for BMD deployment, at least within those quarters in which such opinion is subject to change, depends

* J. I. Coffey, "The Anti-Ballistic Missile Debate", April 1967; Robert L. Rothstein, "The ABM, Proliferation and International Stability", April 1968; and Carl Kaysen, "Keeping the Strategic Balance", July 1968.

** An important exception is in Charles M. Herzfeld, "Ballistic Missile Defense and National Security" *Annals of the N.Y. Academy of Sciences*, vol. 114, pp. 119-125, November 22, 1965.

on the fact that the prevailing estimates indicate that a defense of substantial effectiveness is feasible. Indeed, I myself was shifted from being a mild opponent to something of a proponent of deployment in part by a substantial shift in the estimates of effectiveness prevailing in the 1963–65 era. (The other major reason for my own shift stemmed from an improved understanding of Soviet perceptions of these matters, which will be taken up below.)

With this perspective on their role in the debate, let us consider briefly some of the prevailing technical estimates. The main published sources of such information are the unclassified "posture statements" issued annually in recent years by the Secretary of Defense, especially those issued by McNamara in 1967 and 1968, although some supplementary information has been contained in Government hearings and speeches.

The most common way of characterizing the effect of a BMD system is to estimate the number of lives it might save in various specified circumstances. In a table of such estimates given in McNamara's 1968 posture statement, it was indicated that there could be 120 million American fatalities in certain possible wars of the mid-1970's if no significant BMD were deployed in the U.S. Against the same Soviet forces and attacks, it was indicated that BMD systems costing from $10 to $20 billion could reduce expectable fatalities to between 10 and 40 million Americans, depending on the level of the defense and the details of the war. Damage to production and transportation resources would, of course, be similarly reduced, a result not achievable with economically feasible civil-defense shelter programs. Thus, such a defense might change the postwar U.S. situation from one in which over half the population was gone and recovery in any time period would be problematical to one in which perhaps 90 percent survived and economic recovery might be complete within five to ten years. This difference would be enormous.

It is this possible difference that constitutes the major motivation for deploying heavy defenses, at least in the minds of many analysts, myself included. In effect, procuring such defenses is like buying "insurance" that would limit the consequences of a war; the outcome would still be a disaster, but probably one of a very different order than the result of having the same offensive forces expended in a war with no defenses. The immediate survivors of the war would certainly notice this difference—indeed, it would probably make all the difference in their own long-term prospects for survival and economic recovery.

It is possible that a BMD system might perform in an actual war much less well than expected, because of some unforeseen technical failure; it is, however, about equally likely that the opposing offensive forces will perform against the defenses much less well than expected, which is to say that the defenses may perform much better than expected. (Critics of BMD are prone to emphasizing the first of these points much more than the second.) And, as I shall indicate below, the deployment of defenses may result in saving many millions of lives in a war even if they fail altogether in the war itself.

Of course, the U.S. defense might have to face a Soviet offensive force larger than the one that would have existed if the U.S. defense did not exist. In other words, the Soviets could increase their offensive force so as to nullify, partly or wholly, the U.S. defense. I shall later discuss whether it seems likely that the Soviets would do this; let us here consider how difficult it would be for them to do it. This is one of the important technical characteristics of offense-defense interactions.

A useful way of characterizing the degree of difficulty is with a parameter called the "cost exchange ratio", defined as follows. The U.S. might deploy a particular defense system at a particular cost. It would generally be feasible for the Soviets to add an increment to their strategic offensive forces that would offset or nullify the opposing defense, and this increment of offense would also have a particular cost. The ratio (cost of the offsetting increment of offense)/(cost of the defense) is called the "cost exchange ratio". Thus, relatively ineffective defenses would have a relatively low cost exchange ratio, while a defense system that would be relatively difficult to penetrate would have a relatively high ratio.

Several years ago, it was widely believed that missile defenses were easy to penetrate, so easy that offensive increments costing only one or a few per cent of the opposing defense would serve to nullify it. In recent years, however, it has become apparent that cheap forms of decoys and other penetration aids cannot be relied upon to nullify modern defense techniques. A good defense can be overcome, but it is difficult. This is reflected in the fact that cost exchange ratios for a good defense are in the region of 1: 1, i.e., unity. Thus, *it is about as expensive to nullify a good defense as to build it.*

Some specific examples were provided in the 1967 posture statement. Two postulated defense systems were considered, one costing $10 billion and the other $20 billion. Under the conditions of a hypothetical war in which the U.S. fatalities were estimated to be 100 million without any missile defenses, these BMD systems reduced the fatalities to 30 million and 20 million, respectively, if the Soviets did not change their offensive forces in reaction to the defenses. If the Soviets added an increment to their offensive forces costing ¼ as much as the BMD, they could raise American fatalities to 40 million; if they spent ½ the cost of the defenses, they could raise the level to 60 million; and if they spent as much as the full cost of the defense, the fatalities would rise to 90 million. To raise the level of fatalities back up to the undefended level (100 million)—the usual criterion of offsetting a defense—would require an incremental Soviet expenditure on their offensive forces that would exceed the cost of the defense. These calculations assumed that the Soviets had advanced technology for thier offensive forces and made effective use of it.

It is worth pointing out that these estimates were published by McNamara, who was an intense critic of missile defenses. It is therefore in no way to be expected that these estimates are biased in favor of missile defenses.

Although McNamara published information showing that exchange ratios were about unity as far back as January 1967, and although information to this effect was known in the Government for perhaps two or three years before that, many critics of missile defenses continue to assert that it is cheaper to offset defenses than to build them. For example, Kaysen, in his recent article in this journal, said: "Were we to deploy much stronger and more costly defenses [than the initial Sentinel program] it would remain within the Soviet capability to counter them by corresponding increases in the size of their offensive deployments—*which could probably be made at significantly less cost than that of our increased defenses.*" (Emphasis added.) If "counter" means "wholly or largely offset", as is usual and as Kaysen's context suggests, there is no objective basis for the italicized statement, and there has not been for some few years. As additional examples of peculiar reporting of this matter, an unambiguous misstatement of fact concerning exchange ratios was contained in a much-cited article by Garwin and Bethe,[1] and a very misleading statement was made by Wiesner.[2]

Some remarks on these estimates of effectiveness and cost are in order. To begin with the matter of cost, the two deployments considered above were estimated to cost $10 and $20 billion. McNamara, in speaking about the latter program, several times referred to the fact that many weapon systems proved to cost twice as much as originally estimated, as indeed they have, and suggested that this program would more likely cost $40 billion when completed. Some journalists and others have in turn doubled McNamara's estimate once again, and one can find articles and newspaper editorials referring to BMD systems alleged to cost $80 to $100 billion. It is difficult to escape the feeling that these latter estimates are made purely for their political effect, and have no significant basis in reality. Missile defense systems had been much more extensively studied at the time these estimates were worked out than was true of many of the weapon systems whose early cost estimates proved much too low. Moreover, it is possible for the Secretary of Defense to decide to spend no more than a certain sum, say $15 billion, on investment cost in missile defense, and to instruct the services to produce the best possible defense within that budget, rather than to commit himself to a deployment specified in quantities and characteristics of equipment of possibly uncertain cost.

Obviously the relationship between cost and performance of a system as large and complex as those considered here cannot be specified in advance with anything like precision. This should not obscure the fact that the range receiving major consideration or advocacy is, say, $8 to $20 billion.

For some perspective on this range of costs, it is instructive to consider that the U.S. has spent perhaps $50 billion on air defense since World War II.[3] We are

[1] "[McNamara] finds invariably [in the 1968 posture statement] that the offense, by spending considerably less money than the defense, can restore casualties and destruction to the original level before defenses were installed." Richard L. Garwin and Hans A. Bethe, "Anti-Ballistic-Missile Systems," *Scientific American*, March 1968, pp. 21-31. (Quotation at p. 31.)

[2] "Secretary McNamara . . . concede[s] that an anti-Soviet ABM defense would not be worth the huge expense, because the Russians could nullify its effectiveness at considerably lower cost to themselves." Jerome B. Wiesner, "The Case Against an Antiballistic Missile System," *Look* magazine, November 28 1967, pp. 25-27. (Quotation at p. 26). The Secretary had perhaps quoted such estimates in earlier years, but ten months preceding Weisner's article he had published a posture statement including unity cost exchange ratios.

[3] Herbert Roback, Staff Administrator of the Military Operations Subcommittee, U.S. House of Representatives, in E. P. Wigner, Editor, *Who Speaks for Civil Defense?*, Scribner's, New York, 1968, p. 95.

currently still spending about $2 billion per year on air defense. And, while estimates of the impact of the air defense system on U.S. casualties from Soviet bomber attacks are not available, it is a good bet that the current air defense system is and has been less important as insurance for the country than the major proposed BMD systems would be.

It would be fair to ask how stable these estimates of effectiveness are likely to prove in the future. That is, while it now appears that a U.S. BMD system costing between $10 and $20 billion could reduce American fatalities from 100 to 120 million to perhaps 10 to 40 million in possible wars of the mid-1970's if the Soviets do not substantially increase their offensive forces in reaction, and that the cost to the Soviets to substantially nullify the defense would be at least comparable to the cost of the defense, it is likely that these estimates will still seem reasonable when we get to the mid-1970's?

A question of this form does not admit an unequivocal answer; one cannot say with confidence whether inventions not yet made or developments not yet realized will more favor offense or defense, although there are some reasons for thinking the trend will continue to favor the defense. But a parallel may be useful. In the U.S., we have had fairly high confidence for over a decade that the Polaris submarine force is a reasonably secure component of our strategic offensive forces. The main reason for this confidence resides in the fact that we have conducted a major research and development program—on the order of one-half billion dollars per year—in anti-submarine warfare for many years, and no cheap and reliable way of attacking such submarines has been found. A similar statement is beginning to be true in relation to BMD: we have conducted a major research and development program—on the order of one-third billion dollars per year—in means of penetrating missile defenses for several years, and no cheap and reliable way of penetrating a good defense has been found. This does not guarantee that one cannot be found, and it does not say that expensive ways of penetrating are not known—as are expensive ways of attacking Polaris submarines. But it does suggest that the technical prospects for missile offense-defense interactions, while not yet as stable as the submarine-antisubmarine situation, are likely to prove acceptably stable, and in particular should be a great deal better than the early estimates of air defense proved.

It is worth noting that a BMD system may possibly have important effects even if it later failed to perform as expected in a war. If the Soviets were to react to a U.S. defense by retrofitting their existing missile force with decoys and other penetration aids, without a major increase in the number of rockets, they would reduce the total payload available for warheads, and thereby reduce the potential damage the U.S. might incur in a war even if the defense failed utterly. This effect, which is known in the trade as "virtual attrition" and is often encountered in defensive systems of other kinds, is likely to be quite modest. A more important possibility could arise through re-targeting of the Soviet offensive force because of a U.S. defense; the Soviets might concentrate most or all of their offensive missiles (apart from those used for missile bases or other military targets) on the largest cities to be sure of destroying them, and leave unattacked many medium and small cities. Or they might attack only undefended areas, and leave aside most or all the largest (defended) cities. In either case, the mere presence of the defense could result in saving many millions of lives no matter whether it "worked" or not. Freeman Dyson has summarized this possibility with the amusing observation that BMD is very good at protecting cities that are not attacked; the real point, of course, is that it may sharply reduce the number of significant cities that are attacked.

Let us mention briefly here three other positive reasons favoring U.S. BMD deployment. First, the time may soon arrive, if it is not already here, when there will be some possibility of attacks of anonymous or disguised origin. Since these would not be subject to standard threats of deterrence, active defenses may be the primary protection against such attacks. Second, the possibility of a purely accidental launch of some part of the Soviet force is probably very remote, but the possibility of an unauthorized launch, especially during an intense crisis, may not be so remote and should be protected against. Even a modest defense might be very effective against such an attack; this has been one of the arguments used—rightly, I believe—in support of the current Sentinel program. Third, missile defenses (even light defenses) considerably complicate the planning of an attacker who would penetrate them; this phenomenon seems likely to serve as an additional "firebreak" to the initiation of a strategic nuclear war.

SECTION III

One of the main areas of concern to critics of missile defense has to do with the impact of missile defense on fundamentals of deterrence. While it is certainly natural that this concern should arise, I believe that any specific justification for the concern largely evaporates on examination. Let us consider this area.

The problem has often been related to what McNamara termed the "Assured Destruction" mission of the U.S. strategic forces, identified by him in his 1968 posture statement to mean "an ability to inflict at all times and under all foreseeable conditions an unacceptable degree of damage upon any single aggressor, or combination of aggressors—even after absorbing a surprise attack." (p. 47.) McNamara recognized that what constituted "an unacceptable degree of damage" was not subject to precise specification, and in spelling out this requirement, he said (*ibid.*, p. 50): "In the case of the Soviet Union, I would judge that a capability on our part to destroy, say, one-fifth to one-fourth of her population [i.e., about 50 million Russians] and one-half of her industrial capacity would serve as an effective deterrent".[1]

Let us note here that in this and in every other context in which McNamara discussed this issue, he defined the "Assured Destruction" requirement *without any reference to the nature or scale of the Soviet threat.* I shall come back to this fact.[2]

Because McNamara came to regard the ability to destroy 50 million Russians as the keystone of Western security, he viewed Soviet deployment of BMD as a potential threat to that security, and intended to nullify any Soviet defenses with added U.S. offensive forces. He also appeared to believe, and frequently asserted, that the Soviets had a similar requirement for an "Assured Destruction" capacity, and that any U.S. interference with this requirement would in all likelihood only cause the Soviets to increase their offensive forces. It appears that this perception was at the core of McNamara's opposition to BMD deployment, as it was for many other opponents of missile defenses. The U.S. strategic posture that has evolved from this perception in recent years has been aptly dubbed a posture of "Assured Vulnerability" by Steuart Pittman.[3] I shall later discuss the evidence concerning Soviet views on this matter; let us first review the origin and nature of the alleged American requirement for a fixed large number of Russian hostages.

The U.S. first became involved in the business of strategic nuclear deterrence in the very late 1940's and the early 1950's, say up through 1953. The Soviets had no major ability to attack the U.S. directly in this period and the primary perceived requirement of the American strategic forces was to deter a Soviet assault on Western Europe. This requirement (among others) was articulated by John Foster Dulles in his famous "massive retaliation" policy early in 1954. The U.S. offensive forces that were intended to provide the deterring threat were changing in this period, but the U.S. threat may be roughly summarized as a few hundred bombers armed with pure fission (not thermonuclear) bombs with a yield of a few tens of kilotons, for a total deliverable threat of a few tens of megatons. It is doubtful if the Soviet fatalities that this force would have produced were accurately estimated in that period, and they certainly were not publicized, but it is most unlikely that they would have exceeded a few million, at least until quite late in the period.

Now, there were many criticisms made of the "massive retaliation" policy when it was first publicized, but there were few if any criticisms to the effect that the U.S. threat was inadequately deterring. It is therefore instructive to recall the perceived Soviet threat of that period: It was the Soviet Union of Stalin, believed to have a six-million-man army, a Soviet Union which had only recently subjugated Eastern Europe, and which was believed to have instigated or at least approved the Korean war. Not even the recent Czech invasion makes the Soviet Union of today seem nearly as threatening. And this was the threat that was widely judged to be adequately deterred by a few tens of megatons.[4]

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[1] However, in his table on p. 57 of Soviet population and industry destroyed at various levels of attack, McNamara underlined the entries for 74 million fatalities and 76 per cent industrial capacity destroyed

[2] It will appear throughout that I am highly critical of McNamara's handling of BMD—as, indeed, I am. I should like to add that, in spite of this fact, I still believe he was the greatest Secretary of Defense the U.S. has had.

[3] Steuart Pittman, former Assistant Secretary of Defense for Civil Defense, "Government and Civil Defense", in Wigner, *op. cit.*

[4] As McNamara and others have rightly pointed out, the total yield in megatons does not adequately reflect the total effect of a force. We have, however, no better measure readily available with which to make these comparisons, and the comparisons in these terms will at least not be grossly misleading.

Beginning in about 1954, two important changes occurred. The first of these was what can fairly be called a technological accident, namely, it was found that thermonuclear bombs could be made to work. This made it possible to increase the explosive yield achievable in a given weight of bomb by factors such as 20 or 50 or 100. The other (and more important) change was that the advent of a Soviet long-range bomber force armed with substantial numbers of nuclear weapons presented the threat of a direct strategic attack on the U.S.

In the period when the Soviets could not mount a major attack on the U.S., an implicit part of the U.S. threat to protect Europe was the fact that, even if the Soviets overran Europe at a time when U.S. strategic forces could not have put an immediate full stop to the Soviet production and military establishments, the Soviets would have been unable to prevent the continuation of the U.S. as a fighting society and the continuation of U.S. attacks against Soviet facilities and forces. The Soviets could scarcely have counted on any net gain from an attack on Europe in this situation and could not have eliminated their principal opponent.

When major direct Soviet attacks on the U.S. became possible, the structure of the situation changed considerably. It might then have become possible for the Soviets to have eliminated the U.S. as a fighting society, and thereby to secure Europe and eliminate their principal opponent at one blow. Thus, many strategists judged that there were two reinforcing reasons why it was appropriate to react to this possibility with a large strategic threat to deter it: On the one hand, this possibility might in some crisis have loomed as extremely valuable to the Soviets, a possibility for which they might have been prepared to pay large costs, such as a few million fatalities; on the other hand, if such a possibility came to pass, it would have been essentially and promptly lethal for the whole of the West—in a political sense, in a literal physical sense for many millions, and in an economic sense for the survivors.

The Soviets might in some circumstance have badly wanted to do it, and we certainly wanted badly that they should not do it. Moreover, there appeared to be no technical defense in sight that would have substantially reduced the possible Soviet motivation to do it, or our motivation to deter it. This was the fundamental driving force behind the evolution in the later 1950's and early 1960's of a U.S. strategic threat measure in thousands of megatons—a deterrent threat for which "Assured Destruction" was indeed the correct phrase. It was the result of designing a force that would assure the Soviets that they could not mount a lethal attack against the West without encountering lethal retaliation.

It is clear from the origin of this perfectly reasonable logic that, to the extent the maximum possible Soviet motivation for such an attack might have been reduced, or to the extent the U.S. motivation to deter it might have been reduced, the scale of the retaliatory threat might have been reduced in some corresponding degree. It is this linkage that appears to have been wholly absent from McNamara's thinking about strategic forces in recent years. So far as can be seen from the record, at least when missile defense was under consideration, McNamara was determined to be able to kill 50 million Russians *no matter what* the maximum Soviet threat.

If a maximal Soviet strategic attack were capable of destroying, say, 10 million Americans and 15 percent of our industry, they would no doubt be more deterred by the threat of losing 50 million Russians and 50 percent of their industry than if our retaliatory threat were "only" 15 million Russians and 20 percent of thier industry, other things being equal. There is therefore a certain attractiveness in trying to forget about any linkage between threat and retaliation, and fixing once and for all some intended level of "Assured Destruction" which is believed capable of deterring the Soviets from any actions whatever that might bring this force into play. Among other things, this would spare the necessity of thinking through some difficult issues (though it brings in some new ones of its own, notably the question of how much "Assured Destruction" is "enough"). But there are a number of problems resulting from such a posture, of which the most immediate for our purposes is that it tends to make it difficult for us to limit damage to *ourselves*—i.e., it tends to force *us* into a posture of "Assured Vulnerability".

In particular, a determination to maintain a large fixed level of "Assured Destruction" capability against the Soviets led McNamara to respond to incipient Soviet missile defenses by increasing U.S. offensive-force capabilities, and the theory that the Soviets would do likewise led McNamara to oppose the deployment by the U.S. of an anti-Soviet BMDsystem. In view of the effectiveness of modern defense, we might better have used the U.S. resources committed to increasing our offensive forces to increase our defenses instead. By thus reducing

the Soviet threat, rather than increasing our own, we should have reduced both the extent to which the Soviets might gain by attacking us, and the extent to which we are intensely motivated to deter the attack.

It is easy to understand the effects involved here in a simplified case. Consider a situation in which Soviet and American offensive forces are fixed at similar unchanging levels on each side, and in which both the U.S. and the Soviet Union are building comparable levels of defenses. If the American and Soviet defenses are both "light", then our BMD would not much diminish Soviet ability to destroy us, but then Soviet BMD would not much reduce the effectiveness of our assured-destruction forces either; if both American and Soviet defenses are "heavy", then our assured-destruction forces would be significantly degraded, but so too would the capability of the Soviets to eliminate the U.S. as a fighting society.

This points to the following formulation of a reasonable basic requirement for a conservative American strategic posture:

"Following any plausibly feasible strategic attack by the Soviet Union, the U.S. should have the capacity to inflict as much or more total damage (of similar kind) on the Soviet Union as the Soviets had inflicted and could still inflict on the U.S." [1]

In short, we should have a reliable capability to do at least as badly unto the Soviets as they had done or could do unto us. This would imply that, if the Soviets started a strategic war with us, they would be guaranteed to come out worse—a powerful deterrent to starting such a war. The Soviets could not achieve a significant military advantage by a strategic attack, and an irrational, coercive, or punitive attack—whether large or small—would risk bringing as much or more destruction on the Soviets as they could or did bring on us. This would make the initiation of nuclear blackmail unattractive to any reasonable decision-maker at any effective level of strategic forces.

Let us note explicitly that this posture does not imply that a U.S. capability to destroy 50 or 74 or 100 million Russians is a fundamental requirement of nature, without regard to the circumstances. It indicates that both the United States and the Soviet Union might reasonably engage in some measures to limit the possible damage of a war without necessarily impairing U.S. security in the process. Such measures might include, for instance, direct reduction of strategic offensive forces by agreement—or deployment of defenses with or without explicit agreement.

It is interesting that the U.S. has, in fact, proposed direct reductions in strategic offensive forces. For several years, we have had a proposal before the Geneva disarmament negotiations to reduce such forces by cutting a substantial percentage from each side in each of two stages. [2] It is obvious that this proposal must have been evaluated with regard to some criterion for a strategic posture similar to the one discussed just above; one cannot carry out unlimited reductions in offensive forces and still be able to guarantee the capability to kill 74 million Russians, or whatever such number is selected. Now, if certain necessary requirements are met, as they can be, a symmetric increase in active defenses deployed by each of the superpowers would have approximately the same kind of potential impact on possible war outcomes that percentage cuts in offensive forces would have. It seems odd that McNamara (among others) never appeared willing even to consider possibilities of missile defense in the light of the strategic criteria he applied to percentage cuts in offensive forces.

One may ask: If BMD deployed in both superpowers would have roughly the same effect on possible war outcomes as direct reductions on both sides in offensive forces, why not simply reduce the latter, and save the money and trouble of the BMD? The answer is that in some circumstances one might, but the circumstances are not those now prevailing. To reduce U.S. and Soviet offensive forces to a level where the possible casualties on each side (without defenses) did not exceed, say, 20 million would likely be acceptable to the U.S. only with a degree of inspection that is most unlikely to be acceptable to the Soviets. In other words, there appears to be no current political feasibility to offensive-force cuts on such a scale, while there seems to be ample feasibility to suitable BMD deployment—which, rather than increasing U.S. needs for inspection of Soviet offensive forces, might actually *reduce* our sensitivity to such information. This effect, indeed, would facilitate later direct reductions in offensive forces. (There are other motives for BMD,

[1] This principle implies that the strategic offensive forces must be quite well protected, which appears to be feasible.

[2] U.S. Draft Treaty of April 29, 1965.

such as protection against Chinese or anonymous attacks, that would not be affected by Soviet-American reductions. These motives, however, might be satisfied by a light defense.)

From the mid-1950's to the mid-1960's, the strategic postures of the superpowers were dominated by the logic that, since we could not defend, we had to deter. This position, for which there was originally ample justification, now seems to be interpreted in some minds—chiefly certain American ones—to mean that, since we must deter, we cannot defend. This should count as the *non sequitur* of the decade.

IV

The final major area of concern to critics of missile defenses is that of arms races and correlated arms-control problems. The kind of arms race involved here is what is called an offense-defense race. The usual image of this is that if, say, the U.S. procures some missile defenses, the Soviet Union will feel obliged to respond by increasing its offensive forces sufficiently to nullify the defense. This increase in Soviet offense capability might in turn motivate the U.S. to increase its defense capability still further, and so on. For example, McNamara said (in his 1967 posture statement, p. 53): "*It is the virtual certainty that the Soviets will act to maintain their deterrent which casts such grave doubts on the advisability of our deploying the NIKE-X system for the protection of our cities against the kind of heavy, sophisticated missile attack they could launch in the 1970's. In all probability, all we would accomplish would be to increase greatly both their defense expenditures and ours without any gain in real security to either side.*" (The whole of this passage is underscored in the original.)

If arms-race responses of this kind occur, they will not be because of some fundamental law of nature, but will result from interactions of achievable technology with prevailing attitudes and budgets. Each of these factors is of importance.

It is useful to discuss this problem in terms of the concept of cost exchange ratios. If cost exchange ratios were as low as .01, or one percent, there would be little doubt that, within the present political environment, a defense system deployed by one superpower would be nullified by the other. For example, if the Soviets built, say, a $20 billion system, and if it would cost the U.S. only $200 million to neutralize it, there would scarcely be any debate about the matter within the U.S. bureaucracy, the Congress, or the public: the Defense Department would simply go ahead and neutralize the Soviet defense. In this world, the technology (as linked to budgets) would surely dominate the attitudes, and deterrence would reign supreme; defense would have at most a marginal role, at least as between the superpowers. There would be very slight motivation in either country to build defenses against the other, and most likely they would not be built.

On the other hand, if cost exchange ratios were in the neighborhood of 100 or more, there would again be little debate, but in this world, defense would reign supreme, and deterrence would rest on very different threats and counter-threats than those that loom as dominant today. In this case, to nullify a $20 billion Soviet defense would cost the U.S. $2,000 billion. The expenditure of such a sum within foreseeable budgets is not, of course, a realistic possibility, and the U.S. would instead be building its own defense—about which there would be little controversy, and which the Soviets could not offset either. Again, the technology would dominate prevailing attitudes.*

In the actual world that is upon us of cost exchange ratios near unity, perhaps one-half or three but not one-tenth or ten, the attitudes prevailing are not driven by the technology toward either deterrence or defense, but may (and do) go in either direction. It is much more a matter of preference and conscious decision whether we and the Soviets wish to spend our strategic-force budgets chiefly to increase the level of "hostages" on the other side, or to decrease our own. Thus, whether we are to have an offense-defense arms race or not depends in the first instance on whether Soviet and American attitudes are lined up the same way or not. If both governments are willing to accept a high level of hostages on each side, with modest or no defenses, there will be no great pressures for an offense-defense race; similarly if both are willing to live with substantial defenses and relatively low levels of hostages, with modest or no attempts on either side to offset the defense of the other. But if one side attempts to reduce its own hostages below the level demanded by the other, or attempts to increase the hostages of the other

*Experts may recognize that this discussion is simplified. The principle illustrated, however, remains valid when the complications are taken into account.

above a level the other considers acceptable in the circumstances, and especially if both happen together in any combination, the resulting pressures for an arms race might well be limited mainly by budgetary forces.

The fact that these issues are importantly influenced by attitudes is not always clearly recognized. There is, however, something of a "fashion" in some circles against interfering with the so-called requirements for "Assured Destruction" capabilities on either side, especially when (almost only when) the interference comes from missile defense. But, as I have argued earlier, maintaining very high levels of possible Soviet damage does not seem to be a requirement of U.S. security in circumstances where we can correspondingly limit damage to ourselves, and indeed it is in some degree antithetical to the objective of limiting our own possible damage. Still less, of course, is it a requirement of U.S. security to maintain high levels of U.S. hostages on behalf of the Soviets. Outside of the group who have been actively opposing defenses, I believe that these facts are generally recognized among people concerned with national defense. "Assured Vulnerability" has characterized the trend of our strategic posture in recent years because of the views of McNamara and a few others, not because of the defense community as a whole, most of which has opposed the trend. Therefore, while the kind of fashion mentioned above has and has had important adherents, it seems unlikely to prove dominant in the U.S. policy process in the future. American attitudes in this regard are mixed, but there is at least a fair chance that views favoring more emphasis on defense, views which are in fact rather widely held, will prove important in the evolution of the U.S. strategic posture.

Soviet attitudes concerning hostage levels seem much less mixed, so far as can be seen; they are much more friendly to the deployment of defenses. In particular, contrary to many statements made by American critics of U.S. BMD, it appears that the Soviets are not substantially antagonized by the prospect of U.S. BMD. I shall mention some of the evidence for this.

Let us begin with the passage of McNamara's quoted above, in which he implied that it was a "virtual certainty" that the Soviets "will act to maintain their deterrent", i.e., will act to mullify any U.S. defense by increasing their offense. Now, if the Soviets were in fact committed to a response of the sort McNamara said they were, which would at least cost them substantial money, the first ones we should expect to hear making such statements would be, not McNamara, but the Soviets themselves. So far as can be seen, the Soviets have never been bashful about making political and diplomatic statements designed to deter publicly known U.S. programs they did not like, or to embarrass the U.S. over programs that at least were not advantageous to them. For example, they have repeatedly made public statements opposing the operation of U.S. Polaris submarines in the Mediterranean, and the operation of nuclear-armed air-alert bomber forces.

In the light of past Soviet political offensives against unwanted U.S. programs, it would be remarkable in the extreme if the Soviets had the attitudes attributed to them by McNamara and yet did absolutely nothing to discourage U.S. defenses. The fact is, however, that there seems to be no reliable report of a single instance of a Soviet attempt to deter our BMD by such statements—either public or private, official or unofficial.

There is a great deal of additional evidence, beyond this negative but persuasive fact, indicating that Soviet attitudes have not been at all in McNamara's direction. There have, for instance, been many statements by individual Russians at both official and unofficial levels, both impromptu and carefully considered. In a press conference in London on 9 February 1967, Premier Kosygin was asked: "Do you believe it is possible to agree on the moratorium on the [deployment] of an anti-missile defense system [a then-current American proposal] and if possible on what conditions?" He replied in part: "I believe that defensive systems, which prevent attack, are not the cause of the arms race, but constitute a factor preventing the death of people. Some argue like this: What is cheaper, to have offensive weapons which can destroy towns and whole states or to have defensive weapons which can prevent this destruction? At present the theory is current somewhere that the system which is cheaper should be developed. Such so-called theoreticians argue as to the cost of killing a man—$500,000 or $100,000. Maybe an anti-missile system is more expensive than an offensive system, but it is designed not to kill people but to preserve human lives. I understand that I do not reply to the question I was asked, but you can draw yourselves the appropriate conclusions." Indeed, one can.

A detailed rebuttal to the standard arguments against BMD was given by the late Soviet military publicist Major General N. I. Talensky in the quasi-official Soviet journal *International Affairs* in October 1964. It may be interesting to note that the Talensky article, though not so identified, was at least partly a response to a paper presented to Talensky and other Russians earlier in 1964 by a group of Americans that included the present writer, a paper opposing defenses written by Jeremy Stone but which I had a good deal to do with. I have, of course, since changed my views, although Stone has not.[1] Many other contacts with Russians at official and unofficial levels, including several meetings I personally have had the chance to observe, illustrate that the attitude exemplified by the Kosygin quotation above is very widely held in the Soviet Union, while the attitude held by American critics of BMD such as McNamara or Kaysen toward the alleged importance of maintaining high hostage levels seems not to be held at all. Soviet strategic literature also does not reflect a McNamara-like view. So far as can be seen, the Soviets simply do not adhere to such a model of deterrence.

The only criticisms of BMD that have been expressed by any Russians, so far as I am aware, have come from a few scientists who have been skeptical of the effectiveness of defenses and therefore regarded them as wasteful of resources. It is probably significant that these scientists seem not closely associated with current Soviet weapon programs; I believe it likely that they are following the lead of some of their Western friends and counterparts, except that even these Russian critics seem not to share in the theoretical opposition to BMD. One major Russian scientist who *is* closely associated with the Soviet missile program has said (to Americans) that effective missile defense is on the whole probably realizable.

One additional bit of evidence is worth mentioning. After NcMamara announced the decision to deploy the Sentinel BMD system in September 1967, the U.S. came under attack from several of our allies and neutral friends, especially from several countries participating in the Eighteen-Nation Disarmament Committee then meeting in Geneva, who complained that the American deployment decision would be bad for the incipient non-proliferation treaty and would only heighten the arms race. There was one country that came to our assistance in that context, holding that the decision would not harm the prospects for the non-proliferation treaty: That country was the Soviet Union.[2] So far as I am aware, this is the only case on record in which the Soviet Union has defended us diplomatically against our friends and allies. This is all the more remarkable in view of the fact that the Soviets did not, then or since, believe that the Sentinel system was intended only for Chinese attacks. (In some sense, as will be evident from this article, their skepticism was well placed.)

The fact that the Soviets apparently do not share the view of McNamara and some of his associates toward deterrence and "Assured Destruction" requirements does not, of course, mean that they are disinterested in military matters. It appears that Soviet strategists generally emphasize the importance of maintaining a good position in relation to the U.S., but seem not to understand this to mean that they must maintain some large fixed number of American hostages without regard to the circumstances. The sharp increase in Soviet offensive forces that has taken place in the recent past is evidence that they did not wish to remain in a position inferior to the U.S. in such forces; it provides no evidence whatever that they have come to hold the "Assured Destruction" dogma that has held sway here.

Some American critics of BMD have described these Soviet attitudes as "unsophisticated", and argued that the Soviets will "get over it", and come to respond to an American defense as McNamara predicted even if they are not yet committed to it. It is true that strenuous efforts to "educate" the Soviets have been made by McNamara and others, and one cannot say with certainty that these efforts will fail; it would not be the first time that the Soviets lost their senses over some issue just as we were coming to ours. But their views in the past should not be denigrated: it seems to me, and to many other Western strategists, that the defense-oriented philosophy exhibited by the Soviets makes good sense. As to matters of fundamental approach to deterrence and defense, I should say that we in the U.S. might better acquire some "education" from the Soviets.

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[1] Stone's paper was later published, with modifications, in his book. See J. J. Stone, *Containing the Arms Race*, The M.I.T. Press, Cambridge, Mass., 1966, especially Chapter One, "Antiballistic Missiles and Arms Control."

[2] See Thomas J. Hamilton, "U.S. Says Nike Net Will Spur Atom Pact", *The New York Times*, September 20, 1967.

In view of the fact that Soviet attitudes already seem to favor defenses, and that American attitudes, while currently mixed, *ought* to favor defenses, the obvious way of trying to improve prevailing strategic postures through arms control arrangements is to limit offensive forces primarily, and to limit defenses only secondarily, if at all. This is exactly the reverse of the order of priorities frequently suggested in the U.S. in the past few years. It is, however, more in keeping with the traditional aims of arms control. The primary objectives of arms control have often been stated to be reducing the likelihood of war or mitigating its consequences if it occurs.[1] In view of the arguments of the preceding sections, it seems to me highly probable that deployment of missile def nses will contribute to both of these objectives, while abstaining for defenses will likely contribute to neither. If the deployments are managed with at least modest intelligence in both the U.S. and the Soviet Union, there need not even be arms-race responses that would further add to prevailing arms expenditures.

This is not the place for detailed examination of technical issues, but I should remark that a suitable way of limiting offensive forces in such a context might well be to have an understanding between the U.S. and the Soviet Union, preferably an informal and flexible one, that the total weight of all offensive forces on each side—missiles, planes, and tankers—should be held within some ceiling. This ceiling should be the same for each side and set high enough, at least initially, to include forces on hand or already in procurement. In that case, it would impose no new inspection requirements, i.e., beyond those we already try to satisfy in the present world. My personal inclination would be to exempt defensive forces from controls altogether, except perhaps for interceptor missiles that were large enough to serve as offensive missiles, but if there were a suitable consensus that some mild limitation was desirable, such as limiting the rate of deployment to (say) 1,000 interceptors per year, I should not oppose it.

Many opponents of BMD have agreed that an arms-control program of this form seemed fundamentally preferable to a posture of abstaining from defenses and leaving the offensive forces unconstrained; they argue that a program of the type suggested here will not prove feasible, because it will not prove acceptable to the U.S. military "establishment".[2] This assertion is subject to investigation, and considerable investigation suggests it is incorrect. Many senior military officers, in the U.S. Air Force as well as in other services, are favorably disposed to a suitable ceiling on offensive forces (at prevailing levels) providing it is possible to deploy defenses.

A more important objection to postures with a heavy component of defense that is sometimes encountered is the following. The Soviets might, it is argued, find some way of attacking our offensive forces with sufficient effectiveness so that their defenses could intercept most or all of our remaining offensive forces. By thus initiating the first strike, they might escape relatively unscathed—which, if true, could motivate the initiation of the strike in an intense crisis. It should be noted that the major studies of BMD performance do not show a dramatic dependence on who attacks first, so this concern has no current substantial basis; it is rather an apprehension about some future possible vulnerability that might occur.

Obviously no one could give an absolute guarantee that such a weakness could not occur. It requires, however, a vulnerability in our offensive forces of the kind that people have been trying to prevent for years; only the degree of vulnerability that would be significant would be changed by a heavy Soviet defense. If the U.S. were to provide added protection of its offensive forces by BMD, there would seem to be no reason whatever for believing that postures with heavy defense in both the United States and the Soviet Union would leave us more vulnerable to this type of problem than we are at present.

In fact, such vulnerabilities might be reduced. It is important in considering problems of this type to evaluate the risks of proposed postures in comparison to realistic alternatives, which are not without some risks themselves. In particular, our offensive forces of the present and recent past may well have had important vulnerabilities, including the possibility of undetected ones. For example, Senator Henry Jackson, in a Senate speech of September 25, 1968, discussed electromagnetic-pulse phenomena from nuclear bursts in terms that suggest these phenomena are a continuing source of concern for the security of our offensive forces. A poten-

[1] See my introductory chapter "Setting and Goals of Arms Control" in D. G. Brennan, Ed., *Arms Control, Disarmament, and National Security*, Braziller, N.Y., 1961. The definitions given there have been widely used.

[2] For instance, this seems to be the main point of difference between J. B. Wiesner and myself.

tial vulnerability of a different type might have threatened the fixed component of our offensive forces if the Soviets had developed multiple, independently guided reentry vehicles (MIRV) before we had understood the concept ourselves. There is nothing in the public record that suggests that these have been the only vulnerabilities of major or potentially major concern in our strategic postures of the past. In view of this, it is not at all obvious, to say the least, that a posture of pure deterrence, based wholly on offensive forces, would be more secure against unpleasant surprises (such as a suddenly-discovered extreme vulnerability to a first strike) than postures with heavy emphasis on defense. Even if there were some added risk associated with the defensive posture, this would have to be weighed against the possibility that the defense might save 50 or 80 million Americans in the event of a major war, and make possible much more rapid economic recovery.

It will be clear that I believe an arms-control program giving first priority to constraints on offensive forces, and second priority to limitations on defensive forces, is in the national interest of the U.S.; in particular, it would sharply reduce any remaining pressures for an offense-defense arms race. It is no contradiction that I believe such a program would also be in the interest of the Soviet Union, and therefore in our common interest. Moreover, as recently as September, 1968, I have heard senior Russians suggesting unofficially exactly this order of priorities. There is thus some reason to believe that U.S.-Soviet discussions about stabilizing strategic forces may prove fruitful.

Quite apart from offense-defense races, a different mechanism that might lead to an arms race—perhaps a defense-defense race, or simply a one-sided race of escalating requirements—is sometimes said to reside in the possibility of generalized public pressures for "more". This line of argument is sometimes summarized by saying that, in matters of defense, one cannot be "a little bit pregnant". Our experience in both air defense and civil defense is so much against this idea that it should be dismissed without further discussion. Similarly, it is sometimes said that the American public would not tolerate any inequalities in local defense effectiveness.* We have had a major air defense system with substantial inequalities in local defense effectiveness for perhaps 15 years, and scarcely anyone other than experts associated with the system is even sure of whether his own home city even *has* a local defense, much less how it compares to other cities. The degree of awareness of these matters that has prevailed in the past in the general public is reflected in a public-opinion poll conducted in 1964, which found that two-thirds of the U.S. public believed we had a BMD system all deployed and ready for action!

V

Space has not permitted here a discussion of several other problem areas sometimes associated with missile defense, such as the implications of U.S. BMD for the Western Alliance, or the frequently-repeated assertion (which I believe is false) that BMD would require as a prerequisite a major expansion of civil-defense programs. Several scholars have, however, studied these problems, and I believe it is fair to say that, on examination, they seem even less likely to prove troublesome than the problems already considered.

It seems to me there is little doubt about which way the policy process in the U.S. ought to evolve in relation to BMD. The American body politic is unlikely to judge that pursuit of "Assured Vulnerability" is a proper objective of the Department of Defense.

The defense rests.

*A good design objective for a BMD planner is to make all targets equally unattractive for the opposing offense. This requires that large cities be more heavily defended than smaller ones, but has the effect of protecting everyone equally in a suitable sense. Actual BMD deployments can approximate this objective, so the alleged problem is of limited relevance even in its own terms.

THE RUSSIANS AND "SAFEGUARD" BY JOHAN J. HOLST, MARCH 27, 1969

It has been rather curious, and perhaps telling, that the Soviet Union refrained for so long from commenting on the sharp debate which has developed in this country over the ballistic missile defense (BMD) issue. The Soviet press remained completely silent until the eve of President Nixon's announcement about the revised deployment schedule and configuration.

This silence may reflect a basic equivocation in the Soviet assessment of (1) what U.S. decision would be preferable from a Soviet interest perspective; (2) the expected impact of Moscow's taking a stand on the outcome of the U.S. debate; (3) what posture would be most consistent with the objective of reopening the dialogue with Washington and, in particular, with the objective of having strategic arms talks come about. The equivocation on these issues is still, it seems, unresolved.

The Soviet approach to arms control has always reflected a basic preoccupation with the manipulation of politics, particularly the domestic politics of the adversary. Thus most of the Russian books and pamphlets on the subject of arms control and disarmament contain the word *struggle* (bor'ba) in the title, suggesting the need to mobilize political pressures so as to force otherwise hostile or reluctant decision-makers to consent to arms control agreements.

This perspective does, of course, reflect some basic ideological presuppositions about the distribution of roles, interests and power in the non-socialist world. I am not suggesting that Soviet arms control policy is based entirely on ideology, but we do need to recognize that the ideological presuppositions constitute a kind of explanatory framework facilitating the interpretation of experiences, observations and goals. It constitutes, in short, an image of the world that defines the major actors and their preestablished roles.*

Hence, it was rather surprising that Soviet commentators would remain silent so long in regard to the Sentinel controversy, particularly as it became increasingly clear that the controversy was becoming divorced from the concrete issues of BMD and converted into a confrontation between the "Liberal Establishment" and " the military industrial complex." Such a texture would seem to fit Communist expectations and interpretional categories rather well. In addition, it was clear that the widespread mistrust of the military and the civilian defense management was related to public opposition to the war in Vietnam and to the perceived incompetence with which the U.S. was conducting this war. Such alienation would again appear to be a rather prime target for Soviet propaganda

Hence, it is not unreasonable to assume that the failure to exploit the American controversy propagandistically may reflect a Soviet assessment that the Sentinel deployment would not constitute such a bad move in terms of its strategic implications.

The silence was broken March 13th with the publication of a lengthy article in *Izvestia* by that paper's political observer, V. Matveyev, entitled "Armaments and Disarmament" (I have appended a rough translation, Appendix I). The same day *Pravda* published a shorter article by one of its New York correspondents under the headline "Sentinel—Password for Military Boom."

The Matveyev article is particularly interesting because of its reflection of so many of the Soviet preconceptions and predilections in regard to arms control (Cfr. my list in Appendix II).

I think that one important observation to make about the Matveyev article is that it does not constitute an argument against BMD as such. Nor does it

*The Soviet diplomatic perspective which is particularly relevant to disarmament diplomacy is expressed rather succinctly in a standard work on diplomacy:

"The diplomacy of the socialist states, which is based on the sympathy and support of the broad masses of people throughout the world, exposes with invariable success the aggressive plans of the imperialist governments and their deceptive diplomatic maneuvers by opening the eyes of the peoples to the real state of affairs (deistvitel'noe poloshenie veshchei). It (the socialist diplomacy) does this from the rostrums of the diplomatic conference, in the official diplomatic statements and documents and in the press. The unmasking of the aggressive plans and actions of the imperialists constitutes one of the most important methods of socialist diplomacy, by means of which it mobilizes democratic public opinion and the masses of people throughout the world against the aggressive policies of the imperialist governments." [*Diplomaticheskij Slovar'*, Vol. II (Moscow, 1962), p. 466.]

argue that a U.S. BMD constitutes an arms race inducing system in terms of its interactions with the Soviet strategic posture. The arms race argument is focused, rather, on the political observation that Safeguard is being supported primarily by what is perceived as a hostile military-industrial complex which has no interest in an arms agreement with the Soviet Union, and for whom Safeguard just constitutes another means of stepping up the arms production.* We should note that the article is written by a political observer and not by anybody with established credentials as a military or strategic analyst.

The publication date suggests that it was probably not meant to have any serious influence on Mr. Nixon's decision.

It is worth noting that the particular nature and tenor of the article may also have been chosen for purposes of rationalizing Soviet decisionmaking *vis-a-vis* whatever internal opposition may prevail in the decisionmaking system. Hence the article may constitute an attempt to justify the Soviet policy of entering into strategic arms talks in terms of Communist categories by emphasizing 1) the "progressive" forces in the U.S. which will force the government in Washington to make a deal, and 2) the economic incentives for making such a deal that are present in the West as well, and hence not confined to the Soviet Union. Furthermore, there may be the added consideration of polemizing against the Chinese position.

Given the Soviet outlook as summarized in Appendix II we should, however, expect Moscow to attempt to use its potential power of influencing the American debate as a bargaining lever during any arms talks with Washington. The Matveyev article may thus constitute an indication of what Moscow might conceivably attempt to do in this field.

It is also worth remembering that there were practically no official Soviet reactions to Mr. McNamara's original Sentinel decision in September 1967. The few press reports then only criticized the decision in terms of its constituting a concession to "the military-industrial complex", and they quoted profusely from a New York Times editoral which applied a similar perspective.[1]

The reasons for treating the American BMD plans with circumspection are presumably related also to the existence of a Soviet BMD program. According to President Nixon, the Galosh system deployed around Moscow now encompasses 67 missiles.[2] The total deployment would presumably total some 100 missiles. The Galosh-missile reportedly has exo-atmospheric range so that the system deployed around Moscow may in fact constitute a thin area defense for a substantial part of Western Russia.

Mr. McNamara stated in 1967 that the Galosh system was originally deployed aginst a U.S. strategic attack only,[3] but, according to President Nixon: "Today their radars . . . are also directed toward Communist China." [4] The reported slowdown in construction activities around Moscow is presumably related to the development of a more sophisticated system, including improved radars and a new "super Galosh." Secretary Laird has testified that the U.S. intelligence information suggests that extensive testing is taking place in the R&D field of BMD in the Soviet Union.[5]

The Soviet Union has reportedly spent two and a half times what the U.S. has spent on anti-aircraft defense, which means that they have spent on the order of $125 billion. According to Mr. Laird they continue (in 1968) to outspend the U.S. by a ratio of 3:1 on strategic defense systems.[6]

According to Vikenty Matveyev "the balance of forces which has been reached now offers a possibility to conclude agreements on the freeze and reduction of nuclear armaments." He is, of course, here referring to the recent impressive efforts by the Russians to catch up with the U.S. in terms of strategic delivery power.

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*A brief Tass report in *Pravda*, March 19, 1969, quotes Drew Pearson and *The Chicago Tribune* in support of this perspective. It is also formulated in similar terms by Yury Zhukov in *Pravda*, March 25, 1969.

[1] *Pravda*, September 24, 1967; *Izvestia*, October 4, 1967. The *Pravda* article quoted from a *New York Times* editorial of September 20, 1967 but omitted all references to the Times' arguments about U.S.-S.U. strategic force interactions.

[2] *The New York Times*, March 15, 1969.

[3] *Military Procurement Authorizations for Fiscal Year 1968*, Hearings before the Committee on Armed Services and the Subcommittee of the Committee on Appropriations, U.S. Senate, 90th Congress, 1st Session, 1967 p 303.

[4] *The New York Times*, March 15, 1969.

[5] *Nonproliferation Treaty*, Hearings before the Committee on Foreign Relations, U.S. Senate, 91st Congress, 1st Session, 1969, p. 419.

[6] *Ibid.*

According to Secretary Larid, Moscow is at present outspending the U.S. by a ratio of 3:2 on strategic offensive weapons.* The buildup has been rather impressive over the recent years: It is estimated that the Soviet Union had some 200 SS–7 and SS–8 (Sasin) ICBM's deployed by the mid-sixties. The total ICBM force was estimated to comprise 340 missiles in October 1966, 720 in October 1967 and 900 in October 1968. The present force presumably comprises some 1,000 ICBM's of which some 600 are of the SS–11 (Savage and some 200 of the SS–9 (Scarp) variety. There are also reports of deployment of a solid fuel ICBM (SS–13?).

By 1967 the Soviet Navy had 120 first and second generation (Sark and Serb) SLBM's of which 30 were deployed in nuclear powered submarines. By October 1968 it was estimated that 45 SLBM's were deployed in nuclear subs. They have introduced a new third generation SLBM (Sawfly) and are reportedly producing some seven of the new class of nuclear powered submarines with 16 missiles each per year. Furthermore, the Russians have tested a FOBS system with the SS–9 booster, as well as a MRV system consisting of four separate warheads.

Hence, it would appear that the Soviet incentives for strategic force augmentations have not been particularly coupled to the existence or imminent existence of U.S. strategic defense systems. In fact, the interaction model which is implied by so much of the discussion of the arms race inducing qualities of BMD is rather simple—not to say simpleminded, and based more on the extrapolation of U.S. doctrinal incentives than on an analysis of Soviet actual behavior in analogous situations in the past (e.g., the construction and development of the U.S. continental air defense system).

Indeed we need to develop a much more sophisticated model for the description and prediction of the interaction of such complex decision making systems as the Soviet and American bureaucracies and organizations which influence arms procurement decisions. Insofar as there is any consistent pattern of strategic force procurement interaction, it seems to be primarily of the *imitative kind* rather than the *offset* variety which has figured so prominently in the U.S. BMD debate.

An analysis of past Soviet behavior should also highlight the fallacy of the proposition that the Russians have typically followed a procurement policy which would maximize the off-set capabilities vis-à-vis U.S. strategic capabilities. We need only recall the heavy Soviet investments in day-fighters and tube artillery for air defense during the fifties. Again our analysis of potential Soviet reactions needs to assess the workings and internal bargaining of the Soviet decision-making system. We need to understand e.g. the implications of the Soviet Ministry of Defense being run essentially by the military and of the fact that the average age of the top military leadership is around 62 as opposed to 56 in the U.S. The decisional outcomes of any procurement debate is likely to reflect first of all the peculiar workings of the bureaucratic organization that produce them, and there is little reason to expect the outcome to be ideally designed to nullify U.S. capabilities according to some strategic concept like assured destruction, which by the way, is an American and not a Russian concept.

Thus it would seem that the issue of BMD and its role in any strategic force agreement remains open, and the U.S. should develop a bargaining strategy which is based *inter alia* on a thorough examination of various potential endpoints. An evaluation of the latter should not exclude the option of a posture based on Defense Emphasis and Arms Control. In this connection it is interesting to note that the Tass report of President Nixon's BMD decision, which was carried by *Pravda* and *Izvestia*,[1] did not contain any criticism of the decision, and it quoted the President approvingly to the effect that the U.S. remained willing to enter into strategic arms talks. Again the historical record in regard to Sentinel suggests that BMD is by no means inconsistent with a serious superpower effort at strategic arms stabilization. It was only four days after the Senate voted favorably on construction funds for Sentinel last July that the Soviet Union officially agreed to hold strategic arms talks with the U.S.

Soviet commentators have, quite predictably, focused on the U.S. BMD decision's potential as an alliance-disruptive move, particularly in U.S.-Canadian relations where the issue of consultations remains such a sensitive matter.[2]

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* *Ibid.*, p. 404.

[1] *Pravda*, March 15, 1969; *Izvestia*, March 16, 1969. There has otherwise been no Soviet reactions to Mr. Nixon's decision. A Tass report of March 15 (*Pravda*, March 16, 1969) quotes from *The New York Times* and several senators opposing Sentinel, etc., in a factual and brief article about some of the opposition views. The same applies to a short Tass report in *Izvestia*, March 18, 1969. It is more noteworthy that a *major article* on the resumption of the ENDC talks, which devotes considerable space to the urgency of strategic arms limitations, does not even mention the decision (Article by R. Mikhailov, *Pravda*, March 17, 1969).

[2] See particularly lead articles by O. Vasiliev in *Izvestia*, March 23, 1969, and V. Ozerov in *Pravda*, March 4, 1969.

It may be an overstatement to write as did James Reston that the Russians "even reacted to President Nixon's latest decision to build an antimissile system as if he were doing them a favor."[3]

But the Soviet view of active defenses as a peace-promoting value has remained rather consistent. We need only be reminded of Premier Kosygin's remarks during his press conference in London, February 10, 1967, when he stated: "What weapons should be regarded as a factor making for tension—offensive or defensive? I believe that the defensive systems, which prevent attack, are not the cause of the arms race, but constitute a factor preventing the death of people. Some argue like this: What is cheaper, to have offensive weapons which can destroy towns and whole states or to have defensive weapons which can prevent this destruction? At present the theory is current somewhere that the system which is cheaper should be developed. Such so-called theoreticians argue as to the cost of killing a man—500,000 dollars or 100,000. Maybe an anti-missile system is more expensive than an offensive system, but it is designed not to kill people but to preserve human lives." There is a certain basic and irrefutable logic to this position. The position reflects, of course, a strong defense tradition in Soviet military outlooks but it reflects also, I think, a rather fundamental Soviet aversion to the kind of extreme dependence on others which is implicit in the concept of mutual deterrence.

The following statement by the late Soviet strategist, Nikolaj Talenskij, is revealing on this point: "The creation of an effective anti-missile system enables the state to make its defenses dependent chiefly on its own possibilities, and not on mutual deterrence, that is on the good will of the other side."* We should be aware, of course, that independence in the sense of being immune to the power of others is a chimera. To a significant degree the acceptance of interdependence is a precondition for the stable functioning of the international system and our interest in a strategic posture which implies a defense emphasis ought not to lead us down the blind alley in pursuit of that absolute invulnerability which is neither available nor desirable. In a very real sense international peace and stability presupposes a general reconciliation with the condition of vulnerability to the power of others, but it does not follow that we ought to structure our forces and actions so as to maximize the "assured vulnerability" and make its perpetuation a central objective of national policy. Moscow is, in any event, highly unlikely to accept such a scale of priorities. While the attainment and even pursuit of absolute invulnerability constitutes a dangerous challenge to the moderating influences of the international system on the behavior of the states which make up that system denying them exemption from injury as a consequence of "unacceptable" acts, the current BMD options are not such that they can favor the U.S. or the Soviet Union with impunity. They constitute primarily a means of prudential insurance and it remains, after all, the primary purpose of nuclear armaments to produce prudence in international politics.

Appendix I

ARMAMENTS AND DISARMAMENT

(*Izvestia*, March 13, 1969)

A letter: "Just finished reading the article about nuclear weapons in your newspaper. My feelings in this connection—a mixture of fear, astonishment, and mainly—shame."

This letter was printed in the nook (cozy corner) of the London newspaper, *Daily Telegraph*, March 23, 1968. It was written by a 15 year old youth from London, D. Harris. It is entirely probable that he is from an established family (*Daily Telegraph* does not reckon with the workers). The juvenile which has still not been spoilt by the British "world" raises his voice against the inflammatory military propaganda. Articles and commentaries, authors discussing the use of nuclear weapons with human thoughtlessness, and accustomed to working with the sepulchral spade, appear in the burgeois press of the West every day. For many people in the West they have become commonplace. Who knows, perhaps D. Harris will also in time be reading such articles with an indifferent look. This is possible but by no means certain.

[3] *The New York Times*, March 19, 1969.

*Nikolaj Talenskij, "Anti-Missile Systems and Disarmament," *International Affairs* (Moscow), 10, 1964; p. 18.

The "father" of the American atomic bomb, Robert Oppenheimer, recoiling, as did Claude Easerly—the pilot of the American plane which carried out the atomic bombardment of Hiroshima, from what had been created by his brain and hands, wrote in 1958: "The anxiety of the peoples must become sufficiently deep so that the idea of disarmament can take hold of the masses . . ."

The material mass in nuclear physics will under a comparable activization be converted into colossal energy. Also in the social and political life is it possible for the activization of the masses to produce enormous energy?

Over the last months in the United States of America an original movement is gaining strength. It is possible to place it in the antiwar category but such a designation is inadequate. Under the influence of the news from Vietnam, anti-war demonstrations in the U.S. are continuing and not for the first year either. The movement which has arisen over the last months in America is not directly connected with the protests against the war in Vietnam (although it points in the same direction), it has as its target the so-called "Sentinel project." This is the designation of Pentagon's program for the establishment of a nuclear anti-missile system in the U.S. The decision to initiate work in this realm was made by the Johnson Administration during the last part of its incumbency. It is proposed that 5–6 billion dollars be spent merely as a beginning. Specialists point out that the development of the system will require appropriations ten times, if not tens of times, greater. The experts are not joking when they announce that from the point of view of expenditures "Sentinel is a bottomless barrel." It would amount to a new gigantic pump which would be pumping the money from the pockets of the ordinary wage earners into the safes of the weapons manufacturers.

The Americans are trying not to remember that the Pentagon had already spent, by the end of the 1950's, some thirty billion dollars which are entered in the column "air defense" and which according to the statement of an expert in this field, Herman Kahn, turned out to be obsolete before it was operational.

Fuel to the fire of protests was provided by the statement by the specialist in nuclear physics, Professor E. Saperstein, at a meeting in Michigan in the beginning of January. He said that an accidental explosion of such a weapon in a densely populated region would result in the loss of millions of inhabitants. The catastrophes with American bombers carrying nuclear weapons on board over the Mediterranean and over Greenland constitute a stern reminder.

The Johnson cabinet did not consider it necessary to submit the Sentinel project to Congressional investigation. Meanwhile at the Capitol protests were pouring in from worried Americans. The Republican Senator Percy announced that he received up to 900 such letters a week. He became an opponent of the project. By the beginning of February, 47 Senators, i.e., almost half of the Senate, announced their opposition to the project. Only 24 Senators came out in support of the Sentinel. *The New York Times* remarked that it was the first time that the activities of the military and their influence on the formulation of U.S. policy was encountering such opposition.

It is clear that the opposition in the Senate is only a part of and not the basis of this opposition. Quite a few Congressional representatives used to act as pushers for the military business interests. The protests against Sentinel originate in various layers of the population and constitute an unusual phenomenon in the domestic life of the U.S.A., in so far as it ultimately constitutes a fight against the arms race.

What lies ahead? The question concerns, of course, not only the Sentinel project, but problems the importance of which it is impossible to overestimate in the age of nuclear energy, cosmic speeds, cybernetics and automation; in other words, in the era of a stormy scientific and technical revolution with its unlimited possibilities for developing the earth's resources for creative rather than destructive purposes.

Every day emphasizes with new force the seriousness of this problem. For every day immense means, which are so necessary for peaceful, civilian needs, go into military production. Overseas people like to talk of the possibilities of the American economy. But even in the richest country in the world of capitalism the burden of armaments is becoming increasingly noticeable. Shortly after the assassination of President Kennedy, the text of the speech which he intended to give in Dallas was published. It contained such words as: "The country cannot be stronger beyond its borders than it is at home." John Kennedy pondered the pernicious influence of the policy of the so-called establishment of "positions of strength" in relations with the U.S.S.R. on the conditions within the U.S.A. A

relatively modest step, but nevertheless a step forward, was the international agreement which was signed in 1963 on the limited ban on nuclear tests. A further step in this direction is the agreement on the nonproliferation of nuclear weapons which was signed almost a year ago, but which has still not received its practical implementation because of the failure to sign, particularly, on the part of the government of Western Germany, and also such countries as Japan, Israel, and certain others.

There is a sharp struggle going on over the questions associated with the problem of disarmament. The influential journal "*United States News and World Report*" in its 3 February issue wrote: "The military leadership has prepared requests for weapons for a sum which exceeds 100 billion dollars. This at the same time as American cities are standing in line with their own requests for a sum of a trillion dollars."

In Washington the talk is once more about how it would be good if the U.S. allies in NATO assumed a greater share of the burden of military obligations, which is now placed on the American treasury. But such recipes are viewed as a bitter pill even by the most loyal of the U.S. allies. Western Europe is itself troubled by sharp financial and economic problems.

Effective real steps in the realm of disarmament are needed not by any one country or group of countries but by all countries without exception, for what is involved is the vitally important interest of all peoples. Attempts are made to conceal this fact, to hide it by good-for-nothing theories, and by taking up arms against the struggle for disarmement, so it seems, from strictly opposite sides. The extremes meet, and it is not surprising that in the attacks on the efforts which have been made for purposes of producing progress in the matter of disarmament, the propaganda of the warring circles of the imperalist reaction combines with the Maoist propaganda, in spite of the fact that the former speak as if disarmament is needed only by socialism and the latter grumbles that it is only the capitalist countries which would gain from it.

The objective of these attacks is to block the road to fruitful negotiations on the ripe questions in the realm of disarmament. The military expenditures' curve is on an upward trend because they are being driven on by the indefatigable appetites of the arms producers, above all in the USA. Let us quote American data which are given in the latest report of the U.S. Arms Control and Disarmament Agency. The general military expenditures in the world increased according to these data over the last six years (since 1962) by 50 percent. At the present time as much is spent annually for these purposes as the income produced by the billion people living in Latin America, South Asia and the Middle-East. These expenditures are 40% higher than all the expenditures in the world on education and more than three times as much as the appropriations of all countries on medical insurance.

However, such statistical data divorced as they are from concrete conditions do not reveal the complete picture. Citing them, the report attempts to heap various countries and governments in one pile equating them by one denominator which is the figure of military expenditures. But in addition to arithmetic there is also politics.

In the same report it is mentioned casually that the sharpest increase in the military budget took place in the period 1966 and 1967. What is this? Ill fate? Quite a few authors in the West would want to present the upward turn in the spiral of military expenditures as a result of some kind of automatism, over which man, so to speak, has no control. Nonsense! And the record of the period 1966–1967 confirms this. It was precisely during this period that Washington escalated the war in Vietnam. Precisely during this period did the military business wheels start to spin rapidly in Japan, Australia, Thailand and the Philippines, not to speak of the USA. Washington's decision to escalate in Vietnam was made to a considerable extent as a result of pressure from the magnates of the military industries. It suffices to peruse American newspapers and magazines for the second half of 1964 in order to discover with what fears the organs of big business were writing at that time in regard to the possibilities of a slump in the military industry.

With the yeast of expanded contracts over the last year, the military-industrial complex in the U.S. has expanded even further, both in width and depth. Does this mean that the possibilities of these circles to block disarmament has also increased?

The efforts exerted by the Soviet Union and all peace loving forces on behalf of decisive progress in this area, is not guided by good wishes, they are not isolated from reality. The proposals of the Soviet Union over a wide range of questions

connected with the problem of disarmament which are contained in the memorandum submitted to the last session of the General Assembly of the U.N. are based on an assessment of the world situation.

Insofar as the U.S. constitutes the leader for the acceleration of the arms race, the situation is structured thereby. Many weighty facts show that the resistance inside the U.S. has risen over the last years against the incessant demands of the military-industrial complex.

It is evident that they have reached the limit of the tax screw press. Politicians striving not to alienate the popular masses have been forced to promise that they will attempt to reduce taxes. This means that it will be more difficult for the Pentagon than before to pick the pockets of the wage earners and scooping out of them the sums which are needed to accelerate the arms race. The for Washington ignominious experience of the war in Vietnam constitutes a factor which shows that in our time it is impossible to carry out aggression unpunished. The economic adviser to many large industrial corporations in the U.S., E. Janeway, in his book which was published last year, *The Economic Crisis*, criticizes the government of L. Johnson severely for its escalation of the war in Vietnam. Demonstrating that in the past wars had a stimulating effect on the American economy, the author writes that the war in Vietnam did not lead to an inflow but rather to an outflow of gold from the U.S. and thus weakening the dollar.

Amongst the large American bourgeoisie the demarcation is emphasized between the sober minded and the adventurist representatives. The transformation of two representatives who held the post of Minister of Defense, R. McNamara and C. Clifford is characteristic. Having left the Pentagon they are now advocating a prompt start of negotiations with the U.S.S.R. on disarmament.

Words are, of course, not sufficient. In addition, on high places in the U.S. other speeches may be heard. Their authors suggest "not to rush" into such talks and propose to create positions of strength, etc. Calling for an acceleration of the arms race, for deployment of the Sentinel system, these representatives plead for not creating (the absence of) an agreement with the U.S.S.R. on these questions.

But it is well known that the Soviet government suggests the beginning of talks on the restriction and reduction of nuclear armaments both offensive and defensive. Steps that may be taken in the field of disarmament must not place any state or group of states in an unfavorable position *vis-à-vis* other states. The balance of forces which has been reached now offers a possibility to conclude agreements on the freeze and reduction of nuclear armaments. Many observers in the West are pointing to this state of affairs.

The obstacles on the road of disarmament negotiations are not few but they may and must be eliminated in the interests of all countries and all peoples.

VIKENTY MATVEYEV,
Izvestia, March 13, 1969.

APPENDIX II

THE SOVIET APPROACH TO ARMS CONTROL: SOME GENERAL CHARACTERISTICS

1. Emphasis on arms control (disarmament) as a means to reduce (or eliminate) the opponent's advantages
2. Official hostility to concept of *Arms Control* (as opposed to *Disarmament*)
3. Emphasis on disarmament as a political *Struggle* (Bor'ba)
4. Emphasis on sovereignty
5. Opposition to idea of world government
6. Primacy and pervasiveness of *Politics* (reluctance to treat technical issues as "technical" or A-political)
7. Emphasis on propaganda exploitation of the issues
8. Emphasis on regional regimes
9. Preoccupation with secrecy
10. Preoccupation with Germany
11. Preoccupation with foreign bases
12. Reluctance to consider hypothetical contingencies
13. Propensity for the manipulation of verbal symbols
14. Emphasis on technical accidents and abnormal behavior rather than structural incentives (reciprocal fear of surprise attack)

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