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STRATEGY AND SCIENCE: TOWARD A NATIONAL SECURITY POLICY FOR THE 1970'S

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HEARINGS

BEFORE THE

SUBCOMMITTEE ON NATIONAL SECURITY POLICY AND SCIENTIFIC DEVELOPMENTS

OF THE

COMMITTEE ON FOREIGN AFFAIRS
HOUSE OF REPRESENTATIVES

NINETY-FIRST CONGRESS

FIRST SESSION

MARCH 11, 13, 18, 19, 24, AND 26, 1969

Printed for the use of the Committee on Foreign Affairs

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[To deal with all matters affecting our foreign relations that concern matters of national security and scientific developments affecting foreign policy, including the national space program, mutual defense, and the operation of our high strategy generally]

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STRATEGY AND SCIENCE: TOWARD A NATIONAL SECURITY POLICY FOR THE 1970'S

Introduction

In March 1969 the Subcommittee on National Security Policy and Scientific Developments of the House Foreign Affairs Committee held a series of hearings on the general subject of the effect of space and weapons developments on U.S. foreign policy, with particular stress on the Nation's alliances and other security commitments abroad.

In that effort, we were able to call on the assistance of some of America's most knowledgeable experts. Their testimony, recorded in this document, is a varied, stimulating, and generally comprehensive survey of the vital strategic issues which face the United States today or will likely confront it in the future.

Most, if not all, of these issues are directly related to scientific and technological developments. Since the end of World War II, many of the central issues of American foreign policy—particularly those which affect the fundamental international position and security of the Nation—have become intimately tied to advances in science.

The advances in technical sophistication of armaments and related systems have made new demands on us. They have about them a "nightmarish" quality, as Dr. Eugene Rostow noted in his testimony. Yet they exist in reality and we must be awake to the challenges they present.

The object of foreign policy is to preserve peace in order to advance the Nation's security and interests. These responsibilities demand that we turn close attention both to scientific matters and to ways and means of moving the world away from the edge of the precipice.

Questions of power relations among nations, the uses and limits of power, of future power alinements, and of agreements to control or reduce military power—all these issues must be considered in two crucial ways:

First, in the light of established scientific knowledge and data; and

Second, and even more critically, on the basis of uncertain scientific and technological estimates.

We live in an age when whole families of multi-billion-dollar, highly complex weapons systems have been developed, deployed, grown obsolescent, and have been discarded without ever once having been used in actual warfare.

We live in an age when the measure of a nation's total military power is based on estimates of a vast variety of technical factors, including kinds of weapons, their effectiveness, their command and control properties, and the quality of military-oriented research.

We live in an age when a system of international stability could crumble away virtually overnight because of a "breakthrough" in weapons technology. While Dr. Jerome Wiesner told the subcommittee he did not believe such an event would occur in the next decade, he could not rule out the element of technological surprise. As long as the United States is seriously threatened by powerful adversaries as it is today, the success of our national security policies will continue to depend significantly on the quality of research and development in military applications.

But that is only part of the story. Equally important, certainly, is the quality of our understanding of, and thinking about, strategic issues and the relevancy of the instruments we have created to deal with national security problems.

In many ways, as Dr. Thomas Schelling testified, our understanding of strategic issues has grown with the passage of time. But the need for intensified research and study, as Vincent Rock emphasized, is clear.

Even as we seek to solve current problems, scientific advances bring new issues to the fore. Assistant Secretary of State U. Alexis Johnson pointed to difficulties arising from the growing ability of nations to exploit the riches of the seabed. Mr. Mason Willrich was concerned with the military ramifications of constantly increasing stocks of plutonium being produced by civil nuclear power projects.

As the progress of science tends to outdistance our thinking and our political structures, two serious problems result:

First, science may become the master instead of the servant of policy. Deployments and commitments may be made on the basis of what is possible rather than on what is desirable. To paraphrase Dr. Harold Linstone, to know capabilities tells us little unless we can balance this against future needs or requirements.

No weapons system, no matter how revolutionary, will be helpful unless we can understand how its deployment will enhance our national security. From that point of view, according to Dr. George Kistiakowsky, a military moon base, while feasible, would have questionable value.

Further, as Assistant Secretary of Defense G. Warren Nutter told the subcommittee, we must be aware of the repercussions of technological advances on our allies as well as on our adversaries. Their legitimate concerns must be carefully kept in mind.

The second serious problem is the converse of the first. Scientific progress may make possible new ways of accomplishing objectives which are rejected because they do not fit into the framework of established patterns or organizations.

For example, Dr. Albert Wohsetter, in a statement to the subcommittee printed in the appendix, suggests that the fast deployment capability of U.S. military forces makes certain overseas military bases, like Okinawa, expendable. Yet there is a tendency to cling to established ways of doing things.

Today our Nation has formal security commitments with 42 nations and quasi-commitments to perhaps another dozen countries. In view of scientific and political developments which have taken place in the years since they were made, are these commitments still relevant to America's security interests? If not, how and where do we begin the difficult task of revising them or disengaging from them?

In all such matters choices must be made, often on the basis of estimates rather than hard facts, among alternatives which may be nearly as attractive (or unattractive). Those essentially are political choices which must be made by representatives of the American people in the executive and legislative branches of the Government.

While the views of specialists and experts should be heeded, the ultimate decisionmaking must not be left to the scientists or military planners. If elected representatives of the people shirk this responsibility, our system of democratic government is injured.

It has become clear, therefore, that the Congress must devote its attention in greater measure than ever before to the vital issues of science and strategy, if we are to achieve a reasonable measure of security for the American people in a very unsafe world.

To do this, we must educate ourselves, if not as actual scientists, then as individuals who understand the ways and vocabulary of science. Moreover, we must be aware of developments in strategic thought in this nuclear age.

It was to those closely related objectives that the subcommittee hearings were directed. We sought to score no points for either side of the antiballistic missile debate, but simply to improve our own grasp of the issues involved.

We were not interested in flaying a "military-industrial complex" but rather in better understanding the dynamics of weapons development and deployment, as described by Dr. Charles Herzfeld and other witnesses.

We were not intent on stoking the fires of neoisolationism, but only in making sure that U.S. alliances and security commitments are relevant to the demands of today and tomorrow.

The reader, therefore, may find in the hearings more questions than answers. This was intended. Congress first must ask the right questions if it is to arrive at the right answers.

Having made a broad survey of the matters within the scope of its mandate, the subcommittee now is prepared to deal with individual issues of science and strategy in an intensive and constructive way. In coming months, this will be its task.

In the meantime, it is hoped that this present volume of testimony will contribute to the national dialog on establishing a viable national security policy for the coming decade. Each of the witnesses has made a substantial contribution to our study and deserves serious attention.

To all who testified or supplied statements, the subcommittee is profoundly grateful. Appreciation must also be expressed to the staff members of the Foreign Affairs and Science Policy Divisions of the Library of Congress for their assistance on the hearings.

In concluding, a comment by Mr. Herman Kahn to the subcommittee comes to mind. "If both sides have 2,000 missiles poised, ready to go on 30 seconds' notice," he said, "it is hard for me to imagine that the rest of the century will pass without something happening."

He was speaking of the danger of our destruction and the destruction of our children and our society. We dare not let it happen.

STRATEGY AND SCIENCE: TOWARD A NATIONAL SECURITY POLICY FOR THE 1970'S

TUESDAY, MARCH 11, 1969

House of Representatives,
Committee on Foreign Affairs,
Subcommittee on National Security Policy
and Scientific Developments,
Washington, D.C.

The subcommittee met at 10 a.m., in room 2255, Rayburn House Office Building, Hon. Clement J. Zablocki (chairman of the subcommittee) presiding.

Mr. Zablocki. The subcommittee will come to order. With this session today, the Subcommittee on National Security Policy and Scientific Developments begins hearings on a subject of vital interest and importance to all who are dedicated to the cause of peace.

For the next 3 weeks—and beyond, we will be giving long overdue attention to the effects of space and weapons developments on U.S. alliances and security commitments abroad.

To assist us in our inquiry, a distinguished group of experts have graciously consented to take time from busy schedules to give us the benefit of their knowledge and wisdom.

Here today are two of those men—Dr. Wiesner and Dr. Herzfeld. Before calling on these outstanding Americans to testify, however, I believe it is proper at this time to briefly review some of the background and scope of the subcommittee investigation.

Briefly I would like to state that since the application of the Truman Doctrine, the U.S. strategic policy has been, in essence, an alliance policy.

In an effort to preserve peace and order in the world, our Nation has made security commitments with some 42 nations and quasi-commitments with perhaps another dozen countries.

Almost without exception the United States took on these responsibilities at a time when our Nation held a position of overwhelming nuclear superiority over the Soviet Union.

Today we find the situation radically changed. The Russians have achieved the ability to spread death and devastation throughout our land. Moreover, three other countries, one, hostile China, have joined in the nuclear club, and other nations seem on the threshold of doing so.

Finally, there have been rapid developments in weapons technology and space exploitation which have serious strategic ramifications. As in other areas, science may well be pacing ahead of our thinking about

problems of national strategy, and racing ahead of institutions which have been established to insure national security.

It is, therefore, rational to believe that our security commitments, established from one to two decades ago, have been affected in ways only dimly perceived by past technological developments, and will be affected by prospective developments in the coming decade.

If the quality of our strategic thought and the effectiveness of our strategic policies are to remain high, their constant review is necessary in the light of strides in science and technology. As we open these hearings today, it is in the hope that the formation of opinions which will come from them will contribute to the national debate on these crucial issues and will give us, as Members of Congress, a deeper appreciation of the ways which scientific progress may shape strategic thinking and foreign policy in the days to come.

As I said earlier our witnesses today are Dr. Jerome B. Wiesner and Dr. Charles M. Herzfeld. Their biographies will be made part of the record. We will proceed with the hearings.

STATEMENT OF DR. JEROME B. WIESNER, PROVOST, MASSACHUSETTS INSTITUTE OF TECHNOLOGY, CAMBRIDGE, MASS.

Dr. WIESNER. As I understand my task, it is to try to review the highlights of the technological changes of the last decade or decade and a half which have led us to where we are and to try to give some feeling for the impact of these technological developments and on our foreign policy, and particularly our NATO association, though I would not claim to be an expert on the latter.

I have been involved in many developments which have affected NATO, so I have been on the periphery of the general planning and can speak a bit about this as I go along.

The point I want to stress is the nature of the technological arms race that we have been running, the uncertainties which it has generated for us for at least a decade.

We are facing problems today in our civilian society which we don't know how to manage, and we frequently say that technology has projected us into a condition beyond our ability to plan, to control and to manage our society.

In a real sense, we have been living with that situation in the military field for about two decades. In fact, it was much worse, I would say, 10 years ago than it is today because in the period following World War II we were projected into a sort of a three-fold revolution simultaneously, a three-dimensional technological revolution.

At the end of World War II the United States had just developed the atomic bomb, the fission bomb, which multiplied the explosive power of a given weight of explosive material by a factor of 1,000, which we thought was tremendous.

But in the late 1940's and early 1950's we had the developments of a fusion bomb which multiplied the power of a given amount of material once again by 1,000. So we had to comprehend and contend with an explosive force from a pound of material which was about 1 million times what we had been used to handling in the TNT type of explosive.

Simultaneously with that we had an electronics revolution which ex-

tended our ability to communicate and control. We saw the computer displacing man in the control of aircraft, and making possible the automatically guided unmanned aircraft, the guided missile, and finally the ballistic missile which took man completely out of the control loop, for better and for worse.

These developments made possible much quicker reaction times in offensive systems. At the same time we saw the development of long-range offensive striking power, first by the intercontinental bomber, which still required men, and then with the intermediate range and finally the long-range ballistic missile in which men were completely taken out of the operational loop once a command decision had been given.

As we look back, these all seem fairly reasonable and logical technical achievements. But at the time that we were developing them, each was subject to a rather considerable amount of violent technical argument both about how rapidly one could make such changes and about the specific technical direction.

And because of the three-dimensional character of this military revolution, there was an unbelievable amount of confusion in the planning for our strategic forces. All of this was, I think, further complicated by both the intensity of the cold war, the feeling we had that Stalin, if not madly irrational, could not be counted on always to act rationally. The fact that the Soviet Union was a very tightly closed system from an informational point of view, so that we knew very little about it, made the situation very bad for we had to imagine the nature of threat the Soviet Union posed.

Fear forced us to try to move at a technical pace which probably exceeded our capabilities to go from a conception or an idea to realizable weapons systems in a very short time.

The history of that period is one, for those of us who lived through it, as we look back at it, almost like a bad illness in the family.

As I look back at the fears we had during that period and the frenzy with which we worked, and the failures that we encountered, I can hardly believe now that we, in fact really did it.

We had, as a result of the lack of any creditable intelligence information, and because of the intensity of the cold war, to make some assumptions which, in the end, turned out to be untrue.

Namely, at the time we believed that the Soviet Union was building a very large offensive force. We reacted this way, first in the bomber period—1947–52—and then again in the ballistic missile period—1952–60—and we conditioned our responses to possible, but not as it turned out later, actual threats.

In the case of the first phase of this era, which was the bomber epoch, we responded in two ways: By building a very large bomber force using medium-range bombers, which would either be refueled or based overseas, and intercontinental bombers capable of carrying very large warheads, and we began the development of a very large air defense system.

I spent the first years of the decade of 1950 working on that air defense system. We assumed initially that we were going to have to contend with a Soviet strike of the order of 1,000 airplanes, and we were trying to develop a system to deal with that.

We felt that traditional World War II kinds of air defense systems, that was doing very well when it achieved an attrition of 5 percent, was obviously not adequate for the one massive nuclear attack that we were concerned with.

So we tried to invent a more effective system. For this, we employed the then developing, just on the horizon, electronic digital computers in place of the usual manual controllers.

The SAGE system was developed as part of the system to protect the continent against attack by Soviet bombs. We coupled by means of computers, early warning and tracking radars, a distant early warning system, a family of air defense missiles called Nike-Hercules, Nike-Ajax, and a variety of fighter aircraft. This whole very elaborate system was to be controlled automatically by the computer.

Looking back, it is clear that we never succeeded in creating an air defense system that would have been effective against the threat we had feared. Fortunately that threat did not evolve. As a matter of fact, I think most of us don't believe the air defense system as it evolved would be completely effective against even the more modest threat we now believe the Soviets did build.

But in the process, we did learn a great deal about high-powered radars, about defensive missiles or rockets, and a good deal about the use of computers in real-time military situations.

So this all was in part a very expensive education. I would say, for those involved, like myself and Dr. Herzfeld, in defense technology.

At the height of this air defense bomber development program, about 1952, we began to hear rumors about a ballistic missile development effort in the Soviet Union which concerned us enough that we devised a special radar system capable of tracking missiles fired over what was believed to be the Soviet missile test range.

In 1957, or possibly earlier, we began to see intermediate range missiles, 700- and 800-mile missiles, being tested regularly.

In the summer of 1957 we saw the first intercontinental missile test. Our own serious work on missiles began much earlier, about 1952, I believe. The Assistant Secretary of the Air Force for Research and Development, Trevor Gardner, began to hear so many rumors about the Soviet developments that he began to suspect that long-range ballistic missiles were technically possible. He called a group of us together, both to talk about how to deal with the intelligence problems and to make a decision about whether the United States should have an intensive ballistic program of its own.

This committee was chaired by the distinguished physicist, John Van Neuman and a number of us worked on it. We concluded that missiles were feasible, though at that time the Air Force maintained that they were not.

It was not that the Air Force made a bad mistake. Rather in the year and a half after that judgment had been rendered, the thermonuclear bomb became possible.

The thermonuclear bomb made possible a much lighter warhead for the reasons I indicated earlier; namely, that you could get, for a given weight of material, a thousand times as much explosive power, and this made the intercontinental ballistic missile feasible.

This probably explains, at least this is my view though I have not heard this from anyone who really knows, why the Russians had such

a tremendous advantage in the space race. I believe that they early recognized there was a terrible assymetry in the bomber field between the United States and the Soviet Union, partially because of our industrial capacity but more, I think, because of our base structure, which allowed shorter range bombers to be effective against the Soviet Union than they could bring to bear against the United States.

This is probably the reason why the estimated bomber threat from the Soviet Union never materialized. They threw a great deal of their energy early into the development of a ballistic missile; they made the decision to depend upon missiles several years before we did. The evidence supports this argument for they were testing missiles before us. I believe they must have made the decisions before their nuclear scientists knew that they could build a thermonuclear bomb.

Therefore they did something which probably, in their judgment, was not a good thing to do but the only thing they could do; that is, to build a large missile capable of carrying a modest explosive; namely, a large fission bomb.

The big rocket which they used for their early sputniks and which gave them the advantage that we all know they had in the space race for a long time probably was a result of what was undoubtedly regarded as a very bad military decision later on, but it gave them a rocket which was a particularly useful workhorse for their space program.

We made the decision to go ahead with two smaller rockets, the Atlas and the Titan. The fact that we started two ICBM's is an example of our desperate concern for getting something done.

We were not confident about the Atlas, so we continued that development and started a second missile. These were missiles with about 250,000 pounds of thrust which were big enough to carry a substantial thermonuclear warhead.

As I recall the Russian missile had a 750,000-pound thrust, and instead of carrying a 3,000-pound payload as we planned to do, they were able to carry, we guess, something like 10,000 pounds.

But as a military weapon the Soviet rocket was probably not very good. It was prudent for us to estimate that they would be able to deploy this on a fairly tight production schedule. Our intelligence estimates, and I must admit that I concurred in these estimates, was that in the late 1950's or early 1960's the Russians would have 50, 100, or 200 ballistic missiles of the kind I have just described.

This is what we expected to see. We were, as a matter of fact, all rather surprised that they did not appear.

It was very clear to us that then it would be 1961 or thereabouts before we would have many of our Atlases and a few of our Titans deployed. That is where the so-called missile gap developed. It was based on our estimate of what the Russians should be able to do, judging what we knew to be their developments and what we knew our own schedule was going to be. But there was an interesting development going on in parallel which I suspect must have changed their minds; that was our photographic reconnaissance program.

When I talk about the Russian reactions, I am obviously making my own scenario for what happened, based on the information I have.

Once we developed our own very good reconnaissance capabilities,

first of all with aircraft and later with satellites, we were very surprised that we could not find these large rockets deployed anywhere.

This was a bit of a puzzle. In fact as far as I know, the Soviet Union never deployed very many of their first missile type. I suspect two things happened. They began to realize that their country was not immune to reconnaissance intelligence, such as the U–2 provided, and also because they probably had some hints of the fact that we were developing satellite reconnaissance systems. They must have known from their own development work that this was possible.

Second, the rocket which they had built was obviously a very poor military weapon. It was a liquid fuel rocket of enormous size which must have taken quite a long time to fuel and to fire. It was what we call soft. It sat out in the open on a launch platform. A nuclear bomb going off within miles of it probably would have destroyed it.

I suspect that the Soviet military must have recognized very early that it was a bad device to depend upon and so they started a new generation of missiles which they developed and deployed relatively quickly.

By the time we became really knowledgeable about the Soviet missile forces, we discovered that we had run so hard that we were in fact ahead of them in numbers.

The United States never did have to live with the nightmare that we were worried about so much; namely, a period when the Soviets would have a very substantial missile force that was capable of wiping out our strategic Air Force, whatever missiles we might have had, and our command and control system.

At the same time that we began, or very soon after we began, the development of the Atlas and Titan missiles, we recognized too that they would be vulnerable to preemptive attack, not only because of possible reconnaissance capabilities, but because of the fact that we live in an open society where it is possible for people to know exactly what and where these things are.

So we started the development of a new generation of missiles based on solid fuels. It was almost like starting over, for we had to develop the fuels; we had to develop better guidance systems. Also we had to develop better, lighter, nuclear weapons in order to make solid-fuel missiles practical. So the so-called Minuteman series came along a little later. Then to get the security of the seas we developed the Polaris system, in which we put solid-fuel rockets on submarines.

So we had this whole series of things coming along in parallel and very soon after we had developed the Atlas and Titan we decided they were obsolete and began to replace them with Minuteman missiles.

As we were doing this we had big debates about the numbers of missiles the United States should build and possible reactions of the Soviet Union. Some of us argued for levels that were comparable to what we believed the Soviet force levels were on the grounds that whatever we did the Soviets would eventually match.

People who argued for larger forces won the arguments and the United States deployed numbers which, for several years, enabled the Secretary of Defense to say that we had several times the number of missiles and several times the number of bombers that the Soviet Union had.

At some point they obviously have decided at least to equilibrate this. We don't really know what they are doing. They may even continue and go beyond their present force size. I would hope not.

In parallel with all this development of offensive capabilities, and after we had made an air defense system, we believed that it would be prudent to do research on ballistic missile defenses.

In 1954 we began a series of studies and experimental programs to see whether it was possible in principle to make an anti-missile-defense system. We were all somewhat skeptical then about whether we would be able to actually intercept missiles. The first system we studied used high explosives for destroying the incoming warheads.

It was clear that this would not work well enough. As we got the courage to switch over to nuclear warheads in the defending system we were able to design systems, which, in the absence of countermeasure saturation types of attack, appeared able to intercept small numbers of warheads.

The Nike Zeus system evolved from that. It still had a lot of weaknesses. In the early 1960's, after a good deal of argument in which I participated, it was decided not to deploy the Zeus system, but to try to design a better one, and we began the Nike X, which has evolved into the present Sentinel system, technologically a good deal better. There is still a great controversy about whether it is good enough.

I happen to believe it is not. My colleague here happens to believe it is marginally good.

But this is just another part of the continuing debate, the interesting thing is that this debate is taking place in a country whose mood is very different than it was in the early defense debates which I mentioned. We are not frightened. Also as a nation we are more concerned about own acts. This is, I think, based on two things. One, the better information we have about the Soviet Union and, two, the fact that the military technology has matured.

I am not sure—I am not supposed to talk about the future technology, but it looks a good deal more stable to me than the past. When we began building the ballistic missile, for example we did not know how to make a rocket engine or stable control system. Our first systems using them used to hunt very badly. Also we were not sure of our nuclear weapons. And we had to use vacuum tubes in our electronics and they were very unreliable. Today we have a degree of understanding and maturity which makes us confident that we can do certain things technically.

But man is always trying to make nature do more than it can do and at any given time.

This is particularly true in defense technology and we are never content with what we can do well, but are always pushing beyond the edge of what you might call prudent technology because we have to assume that if we can see better things to do, the other fellow will too.

In some sense I believe, as I have said before, we are running an arms race with ourselves because the United States has a much greater capability for technological innovation than our competitors.

The situation is also better because the Soviet Union is now a somewhat more open society and particularly because of our reconnaissance capabilities. We are no longer required to imagine quite as much.

Obviously our photographic capability does not let us foretell the future, but we at least know what the situation is at the present, something we did not always know in the past.

So we can approach the future in a much more logical and dispassionate way. The debate on the ABM, although it may seem heated, is a more reasonable one than any previous military technological debate that I can recall.

I would hope that as we move to the future and discuss new things, and there are certainly going to be other things that we can see in both the strategic and in the tactical field, new things to do, we will approach them calmly and with full consideration of the alternatives. All of this, both the stability, the security, and the more complete knowledge we have, allows us to think about the other side of the coin, that is using both self-restraint and technology to see whether we cannot stop the arms race. See whether we can't invent situations in which we will have greater security with less expenditure and with less potential danger in case something does go wrong.

I for one think we should spend a great deal of our time and attention moving in that direction.

Thank you.

(The prepared statement of Dr. Wiesner follows:)

STATEMENT BY JEROME B. WIESNER, PROVOST, MASSACHUSETTS INSTITUTE OF TECHNOLOGY, CAMBRIDGE, MASS.

Mr. Chairman, Members of the Committee, my task is to give an historical prospective for the present situation in the arms race by a review of the space developments which occurred during the 1960's. My presentation today will respond to that request, but I would like to start with a short discussion of the period from the end of World War II until about 1960 to set the mood, for it is impossible to truly understand the contradictory currents that existed in the 1960's without an appreciation for the military, political and psychological situation that prevailed during the late 1950's. This was a most interesting period, for though the cold war was most intense, President Eisenhower was exerting a monumental effort to try to bring it to an end and to substitute a period of negotiation and agreement.

The 1950's were also marked by very rapid technological change in all aspects of strategic warfare. In 1950 the thermonuclear bomb was just becoming a possibility with the prospect of multiplying the yield per pound of nuclear explosive by a factor of about one thousand over that of fission material. The intercontinental bomber was just becoming an operational reality. Navigation systems adequate for long-range operation were just becoming available. Air defense missiles and short range tactical offensive missiles were beginning to be feasible, but the long-range starategic ballistic missile was still regarded to be technologically unobtainable or at least so expensive and complicated that it had no place in a military system. Finally, the digital computer was just beginning to emerge as an important element in military control systems.

Every aspect of military technology was in a rapid state of change—explosive power was multiplying, the speed and range of strategic military engagement was increasing vastly, and electronic systems were displacing man from operational and direct command positions. The dizzying pace of change was very disorienting both for the professional strategists and for the civilian leadership in the Executive Branch of the government and the Congress. Even the academic panelists who studied strategic problems and journalists interested in national security affairs could not keep up with the rapidly evolving situation. Rapid advances were also occurring in the military technology of the Soviet Union, and as a consequence a great deal of nervousness existed in the United States about the relative positions of the military capabilities of the two nations. During the 1950's this situation was exacerbated by the almost complete lack of knowledge about Soviet military technology in the United States, an intelligence gap which

led to the conclusion—erroneously as we later learned—that the development and deployment of United States' strategic weapons systems lagged that of those in the Soviet Union's in a very dangerous manner. This intelligence gap was closed during the late 1950's when the Soviet Union began to permit considerably more travel within its borders and American technical intelligence capabilities vastly improved. Also, continuing research and development efforts brought the new military technologies, rocketry, electronics, nuclear weapons, etc., to a point of maturity from which it was no longer possible to make dramatic changes in the military capabilities of the strategic systems from one technical generation to the next even though improvements in cost, reliability, operational ease, etc., justified continued development. These two developments brought about a period of stability which began in the early 1960's and continues to this day. Obviously, the interesting question is whether such stability can be preserved in the face of new electronic developments, space achievements and other highly sophisticated new capabilities. In my judgment there is no immediate danger of this stability being upset though some possibilities such as a deployment of an anti-ballistic system or MIRVs might force the equilibrium level for offensive forces to a higher level.

(The biography of Dr. Wiesner follows:)

DR. JEROME B. WIESNER

Dr. Jerome B. Wiesner, communications engineer and educator, has since 1966 been Provost of the Massachusetts Institute of Technology, where he has served on the faculty since 1946. From 1961 to 1964 he was Special Assistant to the President for Science and Technology and from 1962 to 1964 he was also Director of the Office of Science and Technology at the White House.

Born in Detroit in 1915, Dr. Wiesner received his education in engineering at the University of Michigan. There he was awarded the degrees of B.S. in 1937, M.S. in 1938 and Ph.D. in Engineering in 1950.

One of Dr. Wiesner's early positions was that of Chief Engineer of the Library of Congress during the period from 1940 to 1942.

As a member of the staff of the radiation laboratory at Massachusetts Institute of Technology, Dr. Wiesner worked during the War on the development of radar. In 1945, he was sent to Los Alamos Scientific Laboratory, where he worked on the development of electronic components of atomic devices for the tests at Bikini.

Joining the faculty of M.I.T. in 1946, Dr. Wiesner became full Professor of Electrical Engineering in 1950. In 1952 he assumed the directorship of M.I.T.'s Research Laboratory of Electronics. Following his 1961–1964 service in the White House, Dr. Wiesner became Dean of M.I.T.'s School of Engineering in 1964, and Provost of M.I.T. in 1966.

Dr. Wiesner served as Staff Director in 1957 of the Gaither Committee's study of American military posture. In 1958 he accompanied the American delegation to the Geneva Conference on the Prevention of Surprise Attack. His many consultantships and memberships in governmental agencies and in business and scientific organizations include membership in the Electronics Advisory Group of the Atomic Energy Commission, the Army's Science Advisory Committee, and the National Academy of Sciences. One of his areas of research is anti-ballistic missile systems. His writings include the book *Where Science and Politics Meet*, published in 1964.

Mr. ZABLOCKI. Thank you, Doctor.

Dr. Herzfeld.

STATEMENT OF DR. CHARLES M. HERZFELD, DIRECTOR, DEFENSE SPACE GROUP, INTERNATIONAL TELEPHONE & TELEGRAPH CO., NUTLEY, N.J.

Dr. HERZFELD. Mr. Chairman and members of the committee, it is a great honor and privilege to appear before you, to discuss the important issues raised by current and future weapons systems and their impact on the U.S. defense posture.

I would like to take up roughly where Dr. Wiesner left off and talk about some of the current problems. I want to make it very clear at the outset that I am appearing here as a private citizen, and that I am not representing the views of either the Department of Defense or the views of my present employer.

It is perfectly clear that any serious approach to the issues of national security is one in which arms control plays a large role.

I think we have all learned in the recent past that we need to control, limit, and if possible, reduce the burdens which an arms race would put on the peoples of the world.

We know that we need to reduce the destructiveness of war if it should break out. At the same time we must preserve U.S. military strength commensurate with the requirements likely to be put upon it by U.S. foreign policy.

As far as possible, weapons systems should be designed so as to avoid accelerating the arms race, to avoid increasing the fears of war, and to reduce the likelihood of war.

Beginning in the late 1950's and early 1960's we learned that in a bipolar nuclear world deterrence was the key factor of a policy designed to provide stability. We learned that offensive weapons systems should be able to survive a surprise attack by an enemy, and that therefore, ICBM's should be in hard silos, that bombers should have the ability to take off in time to avoid being hit on the ground, and that submarines with ballistic missiles should be able to hide in the oceans of the world. This approach has worked well so far.

We are now, however, moving into an era which, I am confident, differs from the early and middle 1960's in several important ways. First of all, there has been an unfortunate diffusion of nuclear weapons. Second, the Soviet Union has begun to deploy a ballistic missile defense, and the United States has decided to do so also. Third, the Soviet Union has approached parity with the United States in the number of ICBM's, as has been recently pointed out by former Secretary of Defense Clifford, and it is said that it has probably more payload in these ICBM's than the United States. Fourth, the United States has begun development of the MIRV, and will deploy this. And finally, fifth, and most importantly, there seems to be a real interest by both the Soviet Union and the United States to discuss seriously a limitation of armaments, as stated again the other day by President Nixon.

These and other changes affect in a significant way the national security problem and hence the problem of defense and of arms control. I wish to address very briefly some of the current weapons system issues both as defense issues and as arms control issues.

Several development programs which are now going on and which will have considerable importance in the future are relatively noncontroversial. I will mention a few of these very briefly. In this category I would put the program of the Air Force to develop extra hard missile silos, the development of penetration aids for strategic bombers, and the development of a new strategic strike aircraft, the AMSA. Also, I consider in this category the effort of the Navy to develop an underseas long range missile system, ULMS. All these programs have in common that they make available the means to preserve and

strengthen the credibility of the U.S. deterrent for a long time. The extent to which these new systems should be deployed depends, in my view, on the strategic and arms control situation at the time the deployment decisions need to be made.

The two programs which are more controversial are the MIRV development and deployment, and the ABM deployment. I propose to discuss these in more detail.

First a few comments on MIRV. I believe the decision to deploy MIRV was taken as a counter to the obvious growth in the Soviet ICBM forces, the deployment of the Moscow ABM system, and as a hedge against any ABM capability of other Soviet defensive systems. It is ocassionally said that this deployment is unnecessary and dangerous. Unnecessary, because it provides more missile warheads, than are needed for deterrence, and dangerous because it is said to give the United States a credible first strike capability. I believe that both propositions are mistaken. First, the MIRV capability is essential for the assured ability to penetrate effectively ABM systems. Second, the MIRV deployment will not give the United States a really credible first strike capability because it is clear that the Soviet Union has enough ways to inflict serious damage on the United States in a second strike to make this an extremely unattractive option. In support of this I refer you to the estimated casualties in a nuclear war given in the DOD posture statement of January 23, 1967.

Let me now take up the issue of ABM deployment. Let me begin by giving the "specifications" for an ABM system from an arms controller's point of view.

Many arms controllers—most in fact—say that "the only good ABM is no ABM". This was probably true in the early 1960's when there were only two large nuclear missile powers, the United States and the Soviet Union. At that time a posture without missile defense deployed by either had some advantages. But I believe that this is no longer correct. In fact, I am convinced that the most weighty reasons in favor of the deployment of an ABM of a certain type are arms control reasons.

To keep the tone of the discussion neutral, I propose to talk about two countries, A and B, with large missile forces and several countries, C, D, and so forth, with smaller missile forces. What are some of the large concerns country A, say, should have? What these concerns are depends in large part on how one thinks a nuclear war is likely to break out. Most people talk and worry about an all-out surprise attack by either A or B, or the other way around. This surprise attack is said to occur without any warning, without a crisis, without any hint. While this is certainly a conceivable event, this seems a very unlikely way for major war to start. Rather, several more plausible ways seem to be the following: (1) An accidental or unauthorized launch of a few ICBM's by country A, which is interpreted as an all-out attack by country B. Then country B tries to preempt with an all-out strike against A; or (2) in a very serious crisis between A and B, A threatens to attack a few targets in B, to demonstrate A's seriousness.

Or finally, (3) a nuclear threat by a third country C on either A or B, to force A or B to comply with some desire of C.

Other ways are quite possible to imagine, but these are a few.

In addition, any posture designed to handle the above three threat situations should also have the property that it not accelerate the arms race between A and B, and in particular that it give neither A nor B a credible first strike capability against the other.

One should, therefore, advise a defense system which has the following properties:

First. The defense should be good enough to take care of a few attacking missiles from anywhere. This would take care of accidental or unauthorized launches, and would thus reduce the danger of an accidental war very substantially. Both A and B would find such a system useful.

Second. The defense should be good enough to make incredible a threat by A to attack B in a small way, as a "demonstration of seriousness." Such a defense would have the effect of raising the stakes in such a situation. The "demonstration" would either fail or would have to be a large attack. Therefore, such a defense system would act as a "firebreak" in an extremely serious crisis, and would give both sides a chance to cool off, and to negotiate their way out of the crisis. Both A and B would find such a defense useful.

Third. The system should be good enough to reduce the credibility of a nuclear threat by a third party C against A or B. Both A and B should find such a defense useful.

Fourth. The system should not be good enough to stop a second strike by either A or B, hence it would not imperil mutual deterrence. Neither A nor B should feel threatened by such a system, and hence the system should not accelerate the arms race.

I submit that a thin area defense like Sentinel—with some relatively minor, but important changes—would satisfy these requirements.

To sum up, I am in favor of a thin area ballistic missile defense like Sentinel, with some important but relatively cheap improvements. A "thick defense" buys too little for the dollar—and does have the feature of possibly accelerating the arms race—while the thin defense does some important jobs in extreme emergencies.

The standard arguments against a thin defense system are four:

First. The system won't work, because it has not been tested enough.

Second. The system can be easily countered by third countries, such as Communist China.

Third. The system cannot be stopped from growing into a "thick" system.

Fourth. The system will ruin the chances of serious arms limitation discussion with the Soviet Union.

I believe that all four of these arguments are incorrect. First of all, the system will have been tested very thoroughly before installation, and depends on the large and effective R. & D. programs of the last 10 years or so.

In addition, the principal uncertainties can be approximately bounded or estimated.

Second, it is not correct that a well-designed thin area defense can be easily countered by a third country such as Communist China.

To counter a reasonable system requires good penetration aids, and such good penetration aids are not easily or cheaply or quickly developed. The U.S. R. & D. in penetration aids and related matter of discrimination, has taken many years and cost so far about $1 billion.

The country that wishes to design and build high confidence penetration aids must have research radars of sophistication and complexity comparable to the radars of the defense which the missile with its penetration aids is supposed to penetrate.

If the defense radar system is sufficiently sophisticated and complex, then the penetration aid research radar must be of comparable sophistication and complexity for the effort to yield a high confidence penetration aid.

It is absurd to suppose that Communist China or any other third country can quickly or cheaply develop a radar capability comparable to that of the United States in this field.

On the other hand, if the penetration research does not have the required sophistication, then the penetration aids cannot be of a high confidence quality, and we, and everyone else, would know this fact. Therefore, such low confidence penetration aids would not provide a credible threat.

Third, I believe that it is not reasonably to say that such a system cannot be stopped from growing into a big system, if it is in the national interest to keep the system small. Four committees of Congress, the Secretary of Defense, and the President have an effective veto over adding or enlarging weapons systems. The list of weapons systems which have been stopped, or delayed, or not enlarged in the last 10 years is quite long.

Fourth, and perhaps most important, is the impact of a Sentinel-type system on our hoped-for discussions with the Soviet Union. There is no evidence available to the public that such deployment would jeopardize these talks. Soviet military thought and Soviet weapon system implementation are well known to be heavily oriented in favor of defense systems. There seems to be no reason to suppose that the Soviets would consider a thin ABM system as any kind of threat.

After having said all this, I would like to add that it seems to me that the decision to deploy any type of ABM system is not an easy one, and that the answer, whatever it turns out to be, is not a compelling, but merely a persuasive one. I cannot subscribe to the view that it is "obviously good" or "obviously bad" to have ABM deployed. The answer one comes to depends on many factors, including one's views about the future. I personally am convinced that at this time the decision is likely to be a close one either way, and that the rhetoric of "national doom" is misplaced on either side of this issue.

Let me close on a relatively less controversial note, the use of ABM for the defense of ICBM silos only, the so-called hard point defense. Such a system has many attractive features. The technical problems involved are, in some ways, easier to solve than those of other types of ABM systems. Furthermore, such a use of ABM has the principal effect of increasing the second strike capability of the defended force, a feature which all agree is desirable. Whether or not such an ABM deployment makes ultimate sense is perhaps dominated by the relative cost advantages of the various ways of assuring a second strike capability.

Mr. Chairman, members of the committee, thank you for giving me here the opportunity of discussing these issues with you.

I would like to add the general argument, Mr. Chairman, in favor of some defensive systems against ballistic missiles, which arises from

the fact that it is probably preferable on the average to have a balanced defense posture with some effort to address every major military problem that one might run up against rather than to put all one's eggs into one conceptual basket.

At least I believe this is probably the best posture nowadays. Mr. Chairman, thank you.

(The biography of Dr. Herzfeld follows:)

DR. CHARLES M. HERZFELD

Dr. Charles Maria Herzfeld, a physicist, has been Technical Director of the Defense Space Group of the International Telephone and Telegraph Corporation in Nutley, New Jersey since 1967. From 1965 through 1967, he was director of the Advanced Research Projects Agency of the Department of Defense.

Born in Vienna, Austria in 1925, Dr. Herzfeld came to the United States in 1942. He became a naturalized citizen in 1949. He holds the degrees of B.S. in Chemical Engineering from Catholic University in 1945 and Ph.D. in Chemical Physics from the University of Chicago in 1951.

Between 1946 and 1950, Dr. Herzfeld lectured in chemistry, general science or physics at three universities. From 1951 through 1953, in the U.S. Army, he was a physicist at the Ballistic Research Laboratory in Aberdeen, Maryland. He served in the Naval Research Laboratory in Washington, D.C. from 1953 through 1956. Joining the faculty of the University of Maryland in 1953, he held the rank of Professor of Physics from 1957 through 1961.

From 1955 through 1961, Dr. Herzfeld was associated with the National Bureau of Standards. He served with the Heat and Power Division of the Bureau, becoming Chief of the Heat Division in 1957 and Associate Director of the Bureau in 1961.

From 1961 through 1967, Dr. Herzfeld served in the Advanced Research Projects Agency of the Department of Defense. He was Director of Ballistic Missile Defense, Deputy Director of the Agency and its Director from 1965 through 1967.

Dr. Herzfeld's awards include the Meritorious Service Medal of the Department of Defense, presented to him in 1967.

Dr. Herzfeld edited *Temperature, Its Control in Science and Industry*, Volume III, published in 1962. He is Associate Editor of the *Journal of Defense Research*.

Mr. ZABLOCKI. Thank you, Dr. Herzfeld, and thank you, Dr. Wiesner. I, for one, am not a scientist and therefore I have received quite a lesson today as I expect to in the next few days.

Certainly, however, in following the news in the various media, one cannot help but come to the conclusion that advances in science and in military developments certainly have in no small way affected our foreign policy.

The basic purpose of this committee is to deal with what effects space and weapons development have had on U.S. alliances and security commitments abroad in the past and what they may be in the future.

Dr. Wiesner, in your very succinct yet quite thorough review of the history of our military development you certainly have pointed out that obviously the lack of communications and the lack of accurate intelligence have caused our country to undertake certain military developments and actions—development of a military posture—which could have been avoided.

I believe that history is prologue. We can learn from our past mistakes to see how we can improve in the future.

Lest I go any further, we are under the 5-minute rule and I will ask my question. I will ask all members to abide by the 5-minute rule and then we will come back again to pursue or develop a question.

A question to you, Dr. Wiesner, one which certainly affects our foreign policy with our neighbor to the north. With the Dew Line and other defense systems against the Soviet air attack, the United States puts its shield not over our own territory but also over Canada.

The ABM program, however, would not protect our neighbor to the north, and because of the nuclear nonproliferation pact we are prevented from providing them with a similar system.

Is there any evidence about Canadian displeasure about protecting only U.S. territory or can you see such a development?

Dr. WIESNER. I am not aware of Canadian reaction one way or the other to the Sentinel deployment. Maybe they ought to be a little uneasy about the fact that some of these nuclear warheads in the defensive system would go off over their country.

I would imagine that the deployment of the Sentinel system might make it possible to defend, if they wanted them defended, some of the more southerly Canadian cities.

They might thank us not to defend them. But in the air defense arrangements with the Dew Line to the north, and a great deal of the air battle occurring over Canada, they were in fact active partners in the systems.

The Canadians participated in the deployment and construction of the Dew Line. They were part of the NORAD, the North American Continental Defense System, and were integrated into it.

They have shown a growing reluctance to participate in the strategic defensive things in recent years. I am not at all aware of any discussions about Sentinel with them about the ABM, but possibly Dr. Herzfeld is.

Dr. HERZFELD. No, sir; I am not.

Mr. ZABLOCKI. Thank you, Dr. Wiesner.

Dr. Herzfeld, in your presentation and statement you list the A and B countries, with country C possibilities, I am intrigued by a further possibility where country A or B is not necessarily threatened by C, but country C in the mood to cause some trouble would, indeed, send a nuclear bomb on country A.

There is not any real assurance or any way to track or be positive from where the bomb would come, as I understand the present system.

Therefore, B could very likely be blamed for C's offensive venture.

Dr. HERZFELD. Mr. Chairman, I believe the issue runs roughly as follows: If the missile is an ICBM, with present and future programed warning systems, we would probably be able to tell which country it was launched by.

Probably, not perhaps for sure, but very probably. On the other hand, if a missile is a submarine-launched missile, it is probably impossible to tell which country launched the missile because the missile simply comes out of the water.

Mr. ZABLOCKI. Therefore, the property that you would expect would be most desirable, or desirable among others, would be the third, that the system should be good enough to reduce the credibility of a nuclear threat of third party, and also to allow you to be sure whether A or B or C has indeed started the offensive.

Dr. Wiesner, I see you are shaking your head.

Dr. WIESNER. I am agreeing. I don't think under all circumstances you would be able to tell who would do this.

This is what is called a mischievous attack in the profession.

I think it is very unlikely, too.

Mr. ZABLOCKI. Wouldn't it be advantageous for China—and it will someday have the capability of a nuclear submarine attack—to enter into such a mischievous attack?

Dr. WIESNER. They could certainly attack Russia. I don't think that, as Dr. Herzfeld says, there will be at least some capability of knowing where an attack came from, so that they would have to at least calculate what would be the consequences of really our knowing this.

If they made that calculation, I think they would be forced to think at least 10 times before they did it. We have the capability of thoroughly destroying China at will. Though I don't suppose we would do that if they just dropped one nuclear bomb on us.

I can't talk about another country, although other countries, of course, do not have a nuclear capability except Britain and France. I guess we would not assume that they are likely to do this kind of thing.

But even another country, in a different part of the world, could not be certain that we would not have good enough information to know what they had done.

We might ourselves have to admit to ourselves that we were not absolutely sure we would always know, but the odds would be that we would have some information that would guide us.

Dr. HERZFELD. If I may add a comment to this, Mr. Chairman, I think this is exactly one of the weighty arguments in favor of the thin defense that is properly designed. If one does get attacked by an unknown threat of this sort, provided that threat is reasonably small, then the national command authority can take a position that no immediate response is necessary, that the attack can be absorbed, and since you don't know who you are at war with you can wait and try and find out.

Dr. WIESNER. This depends on what you mean by a small attack. I think it is the position of many people who have looked at this system that you could not be at all certain that it would respond adequately and fast enough in a period of tranquillity to a single weapon coming in, or even two or three. The command and control structure is that ill defined, I believe, there do have to be precautions on our side, too.

In the defensive system we are dealing with very large nuclear weapons. In principle, at least, they have to be under control of the President. As you already indicated, what is one man's defensive weapon could be another man's offensive weapon.

The Spartan is a long-range rocket and as indicated, it can go to Canada from many of the sites in which it will be installed.

It has large nuclear weapons on it. So the thing will be—will have to have some restraints imposed on it. Whether we can design a rapid enough responsive system so that it has the capability of unambiguously detecting and identifying one, two, or three attacking objects coming in from the sea, let us say, giving a total warning time of a couple of minutes, and firing defensive shots, is, I think, a very great question.

Mr. ZABLOCKI. I have further questions on intelligence and reconnaissance, but my 5 minutes are up.

Mr. Thomson.

Mr. THOMSON. Mr. Wiesner, in your prepared statement, you say that a period of stability began in the early 1960's which continues to this time.

Then you say there is no immediate danger of this stability being upset, though such a deployment of an anti-ballistic-missile system or MIRV's might force the equilibrium level for defensive forces to a higher level.

Would you elaborate first on the antiballistic system as forcing an equilibrium level higher?

Dr. WIESNER. If I am talking about stability between the United States.

I am talking about stability between the United States and the Soviet Union. Suppose we each made the decision to buy an antiballistic system, the type some people in both countries are advocating, capable of providing some defense against the other country's nuclear force.

Mr. THOMSON. You are talking about a thick system.

Dr. WIESNER. Yes.

Mr. THOMSON. Let's limit them to a thin system.

Dr. WIESNER. I did not say that. You asked me to talk to my statement. Let me talk to the statement and then I will come back.

The thick system was what I had in mind though I can talk about the impact of the thin system as well. But what would happen I am certain, in case of a thick system is that both of us would overestimate the capability of such a system and take various measures, either buying more missiles or buying multiple reentry warheads, or buying a maneuvering reentry vehicle or doing something which would make it possible for us to say unequivocably that we can cope with that defense system.

So you would have a new level of offense. I think history has indicated, and I believe it would be the case again, that the fellow who has to design the offense will overestimate the capability of the defensive system and, therefore, he will overbuy.

When he has overbought enough to be sure that he can penetrate the defense, he will stop buying and the defense will quit building and we will be up to a new level of cost and offensive and defensive deployment.

In the very unlikely event that a war would occur, the total destruction on both sides would undoubtedly be greater than it was when we started the cycle.

That is what I was referring to. In the case of a thin system this wouldn't happen if it could be kept thin but I don't believe it could be held to a thin system. That is a real question mark in my opinion.

Even the Sentinel might do something because many of its components are not distinguishable from parts of the thick system. Among them the PAR and MSR radars.

Of course, this was one of the worst aspects about the modified deployments that the Army was carrying out. It was locating the Sprint missiles around cities.

This indeed is the beginning of a thick system. A prudent opponent has to assume that we were deploying a thick system because he can't read our mind.

He may, in fact, anticipate our decision, just as the United States is anticipating Soviet deployment of defenses, and buy more offense long before it is needed.

So even the possibility of a reasonable looking deployment can stimulate an offensive reaction.

The Soviet Union may have already begun to react to our plans for all that we know.

So even a thin system could provoke some response, although this is a matter of judgment. I am not asserting that it will happen.

History will show that it will, I suspect.

Mr. THOMSON. If it could be limited to a thin system, do you think that would provoke this equilibrium level to increase?

Dr. WIESNER. My judgment is that it will provoke some increase, but not to the extent that a thick system would.

Mr. THOMSON. Let's go on to the MIRV's that you mentioned in the same statement. What about that factor as an escalation or an increase in the equilibrium level?

Dr. WIESNER. To the extent that something like the MIRV is done by the United States or the Soviet Union, makes each of us believe that our strategic force is in danger it may stimulate a reaction. A MIRV really is in one sense equivalent to buying more missiles but not quite because, as we move from a single warhead on a given carrier missile, to multiple warheads, we get more independent weapons but we also go to lower yield warheads so that their effectiveness is not quite as great for a counterforce weapon.

Nonetheless, the employment by the United States of MIRV weapons on our missiles must cause the Soviet Union to be concerned enough to at least reexamine their posture and ask whether they have enough missiles to survive a U.S. attack.

If they conclude that they don't, their response will somehow add to their force or protect it. So a natural response, I suspect would be to match an MIRV deployment in one way or another.

One may match it not because of a real military need, but just for rhetorical reasons. I suspect, although I couldn't prove it, that one of the reasons that the Soviet Union has sought to equalize forces had nothing to do with the strategic calculations but the political posture which they have been in and which the United States has been able to exploit for a number of years by claiming that we "outgunned" the Soviet Union loudly and in a way that must have been embarrassing to their political leaders at home and abroad.

Mr. THOMSON. Would you say that establishing the MIRV's is more likely to escalate or raise the equilibrium level than a thin system, if kept thin?

Dr. WIESNER. It depends entirely, as I said earlier, on the nature of the thin system deployment. If it is one that is clearly an area defense system, I suspect the impact on Soviet deployment will be modest.

I think the deployment of MIRV is certain to bring a response, if, on the other hand, the thin system looks as though it is easily expansible into a thick system, I suspect that you would see a reaction.

But I don't want to make this point strongly. I just don't know. I think the experience we have had is that these things tend to escalate, not any one year but through time. You see, I don't believe that the

thin system is adequate as proposed, to give the kind of protection advocates claim it will give against the—against China, at least after China has a few missiles.

Therefore, I think we will be under considerable pressure to make it look a lot more like the thick system even to protect us against China.

It is then that I think the ambiguities will begin.

Mr. THOMSON. The Russians have already deployed an ABM system around some of their cities. Did that cause any offensive escalation on the part of this country?

Dr. WIESNER. I believe so. I believe the MIRV's that we are putting in is our response. It is a massive overreaction to that particular system.

Mr. THOMSON. Why is it that there is so little outcry against an escalation of the offensive type weapon but there is a massive disturbance about the installation of the so-called defensive system.

Dr. WIESNER. I don't know. Some of us who are trying to use our influence to limit the arms race, of course, have been talking about—talking out against both of these actions and trying to suggest that we be moderate.

I think the major outcry against the ABM in this recent round has come because of the public consciousness of it.

I think the offensive systems are much less abstrusive. People are not conscious of them. They can be put in quietly. But an ABM is different. It does not do a lot of good to defend half of our population, so an ABM has to be a massive thing. On the other hand, an offensive system can be put in a little at a time and what is more, does not show up as an enormous budget item.

It is not anything that the U.S. population has to think about in terms of what the impact is for them, though the long-term impact could be very serious.

An offensive system is not put in their backyard, it is not something that they are conscious of and therefore, not subject to the same kind of debate, I agree with the implication of your question.

It is just as serious a move from the point of view of where the world is going and one which ought to be debated just as much.

Mr. ZABLOCKI. Mr. Fountain.

Mr. FOUNTAIN. You gave a very succinct statement in your remarks, Mr. Chairman, about our two distinguished witnesses this morning.

I wonder if you might include in the record a biographical statement from each of them. Those who read the record will have then a factual outline of the training and experience of the two witnesses before us today.

Mr. ZABLOCKI. I have a limited biographical sketch.

If the witness will supply a further statement it will be made a part of the record. (See pp. 9, 14.)

Mr. FOUNTAIN. Mr. Chairman. Sometimes we go along and use terms, or hear them; presuming that everyone knows what is being discussed and failing to ask questions because of fear it might show our ignorance.

Noting in the audience today a number of young people, any one of whom might some day be one of the participants in the pushing of a button that might destroy much of mankind and the world, for the record, will you please explain the MIRV and thin anti-ballistic-missile systems and tell us how each operates.

Dr. HERZFELD. Just let me start with the MIRV, Mr. Fountain. The idea here is relatively simple. You pack several warheads on something that is occasionally laughingly called a bus, and this bus sits on top of the rocket.

When the whole thing gets launched, the bus pushes the different warheads in the right direction. That is really all there is to it. As Dr. Wiesner pointed out, these warheads are generally smaller, lighter, and with a lesser yield than the one warhead that you replaced.

The programed force that is now authorized contemplates introduction of a number of warheads on Minuteman—though not only on all of them—only some Minuteman II are to be replaced with Minuteman III, which is the MIRV type, and the replacement of a fraction of the Polaris force with the Poseidon missile which carries a number of these MIRV warheads.

That is the basic point on that system.

The thin defense—well, that depends a little bit on whose thin defense you are talking about.

Mr. FOUNTAIN. The one we are now talking and debating about in the Congress and throughout the country.

Dr. HERZFELD. Let me address what I understand to be the proposal before the country. This thin defense is an area defense. It is now intended to defend all parts of the continental United States, perhaps also Alaska and Hawaii. I think Alaska and Hawaii are options that are not essential to the basic notion of the defensive system. The system defends all of the continental United States thinly in the sense that a large missile attack would certainly overwhelm the defense.

No one pretends otherwise. It defends the continental United States more or less uniformly but with some concentration of defensive capability in the eastern half because that is where more of the population lives.

It is, in general, a good idea in a defensive system to tailor the distribution of the defense so that the attacker has to pay, shall I say, the same price per people attacked or the same price per factory square foot area destroyed, so you want to make the defense relatively thicker where there is more to defend.

The components of the Sentinel defense are the following: There is a perimeter acquisition radar called the PAR and the notion is to have a number of these, approximately 10, on the periphery of the country. The function of these radars would be to detect any missile threat that comes against the United States.

Then there is a component called the missile site radar. The function of these radars is to track the missile that is coming in and to track the interceptor that is going out to meet them.

These missile site radars would be deployed wherever there are missiles and more or less uniformly across the country, because you want to defend the whole country.

The present plans call for the order of 20 of these. Some of these have more than one face. You can adjust that. You can give them one face, two, three, or four, depending upon how much around-the-clock coverage you wish.

The next component is the so-called Spartan missile which is a large intercept missile. It is a development of the old Nike Zeus missile. It

is bigger, better, more expensive, and it carries a large warhead to intercept incoming threats far away.

Exactly how far away I believe we cannot discuss in an open session.

Fourth is the Sprint missile, which is a short-range interceptor whose function is primarily to defend the radars, particularly the PAR's, the perimeter acquisition radars.

If you did not defend them with a special, close-in defense, the system would be vulnerable to a special attack against those radars, and as soon as they have been knocked out, the system would be gone, it would be off the air.

Finally, as Dr. Wiesner mentioned, there is the complicated computer, command control and analysis, guts of the thing that really makes it play.

These are the five components.

Mr. FOUNTAIN. But human beings have to operate it. Is it computerized?

Dr. WIESNER. It is computerized.

Mr. FOUNTAIN. But human decisions and judgments do enter the picture at some point; don't they?

Dr. HERZFELD. As I understand the system, Mr. Fountain, the main point at which this enters then is the decision to launch or not.

Dr. WIESNER. Or a decision that an attack has occurred.

Dr. HERZFELD. In fact whether to launch or not, someone has to look at the evidence that comes in to see whether this is a threat or not and evaluate whether the threat is real, and if it is real, to launch.

Mr. FOUNTAIN. Dr. Herzfeld, these are purely defensive systems. They are not designed to kill a single human; are they?

Dr. HERZFELD. That is right.

Mr. FOUNTAIN. They are designed to protect America?

Dr. HERZFELD. Yes.

Mr. FOUNTAIN. I guess my time is up, Mr. Chairman.

Mr. ZABLOCKI. Mr. Broomfield.

Mr. BROOMFIELD. I will yield to Mr. Findley.

Mr. FINDLEY. I have two principal questions. One deals with the character and size of the political position that ABM is obviously in the position of acquiring in this country, and the other relates to the relationship of the nonproliferation treaty and the ABM system.

Last year I did my best in this committee and on the House floor to make sure that a reservation was made—was placed in the treaty.

I did it by means of the arms control authorization. It would permit our country providing an ABM system to other countries should they desire. Dr. Herzfeld made quite a point of the importance of ABM as a defense against the accidental attack.

If this has any validity for the United States, it surely would have greater validity for a country that does not possess any deterrent nuclear weapons at all.

I can't see how we can properly prohibit the distribution of successful ABM systems to other countries that might desire to buy these systems.

Yet that is the effect of the nuclear nonproliferation treaty.

Dr. HERZFELD. May I answer that?

It seems to me that that is really not as serious an issue as it might at first appear. First of all, other third countries are not likely to feel

as threatened by missiles, they may feel threatened more in other ways.

Mr. FINDLEY. Like Germany, for example?

Dr. HERZFELD. May I go on?

That is not the example I had in mind.

Mr. FINDLEY. India?

Dr. HERZFELD. India need not feel threatened by missiles.

Dr. WIESNER. But it does.

Dr. HERZFELD. Second, the likelihood of such countries being able to afford such a defense is extremely small.

Mr. FINDLEY. Presumably we would have the capacity to build this and sell it to the countries that felt that need for defensive protection?

Dr. HERZFELD. I don't think they would be able to afford that. The third issue I see is that once you get a defensive system into an area that is close to the Soviet Union, I think then it makes this difficult for the Soviets to distinguish a defensive from an offensive missile.

Mr. Fountain raised a very important point in my mind. An ABM system in the United States is not threatening anyone because we cannot shoot at anyone with it.

Mr. FINDLEY. Is an ABM system in Germany a threat to anyone?

Dr. HERZFELD. Yes.

Mr. FINDLEY. How?

Dr. HERZFELD. Because you could launch an ABM missile like a Spartan and make it impact on the ground if you wished. It makes a not-too-bad medium-range missile.

Mr. FINDLEY. Would an ABM missile system in Britain be a threat to anyone?

Dr. HERZFELD. It could be so construed.

Mr. FINDLEY. And France?

Dr. HERZFELD. It could be so construed.

Mr. FINDLEY. So we are the only ones in the happy position of being able to possess an ABM system without it being a threat to anyone else?

Dr. HERZFELD. I think this is true. I believe a Soviet system, if fully deployed, could use its long-range defensive missiles against Western Europe.

This is one of the facts of the case.

Mr. FINDLEY. And against China?

Dr. HERZFELD. Yes. My own conviction is that I think it would be a mistake to modify the nonproliferation treaty on that account. I think it is one of the costs one would have to take into account.

Mr. FINDLEY. Dr. Wiesner, sir?

Dr. WIESNER. I think I agree. First of all, if they are going to use their own money, they would not buy it, in my opinion, if they looked at them dispassionately.

If they thought we would give it to them, there might be a different view. The issue that you raise is a very important one, not because I think anybody will want this type of defense, but for a very different reason.

I think that many of the people who are reluctant to sign the nonproliferation treaty, like Germany and India—and I think they have very different reasons—are still saying the real problem in the

world is the big powers arms race, and they would like to see restraints there, too.

"You are asking us who have not done these things to tie our hands while you people are going ahead racing." The ABM also is part of the arms race, if you view it as deployment by the United States and the U.S.S.R. These things become very serious political problems within those countries.

India, I think, has reason to worry about being threatened by nuclear weapons, from China. China is not too far away. India does not have a retaliatory force. It is a political issue in India.

India cannot afford to build a nuclear strike force. Yet for the Indian Government to sign away the right to do this with China as a neighbor is a serious political consideration.

If the opposition, and there is always opposition in every democratic country, whether it is—whether the opposition makes sense or not, seizes the issue, they can say, "You are signing away the right to defend yourself against the Chinese nuclear threat, while the Soviet Union and the United States go on doing anything they darn please."

I think this question is more important than the question of whether or not they would have an ABM.

Mr. FINDLEY. You say other countries probably would not want to buy the system because it would not be worth the money. I presume the same factors that would lead them to that decision should also lead us to the decision not to buy it, too. Is that correct?

Dr. WIESNER. I would not say that. I think it is an easier decision for somebody closer to the points of attack, because the system gets less good quickly as the range of attack gets shorter.

That is why I think that the Sentinel system will have much more trouble contending with offshore attacks from submarines, for example, for which it is not designed.

Mr. FINDLEY. Mr. Chairman, these gentlemen are here as scientists, and naturally, here to speak to the scientific aspects. But they are also in the unique position, I think, to describe the scope of the constituency that has already developed behind the super weapons projects and is likely to develop in the future.

I would be glad if they would give us some kind of rough brush strokes indicating how big and how powerful this constituency is, and how it might influence decisions of Congress in future years if we take the initial step on the thin system.

Dr. WIESNER. This is a hard question to answer because I don't subscribe to the devil theory of political forces. Though I recall that when I was working for President Kennedy and we were having to make the Nike Zeus decision, which I think everybody now says was the correct decision, he was under tremendous pressure from a lot of people.

The military should be putting pressure on the executive branch of the Government. This is their job and I don't think we should condemn them for that.

We hire them to defend us. I think that within proper limits and in dealing with the Congress and the executive branch of the Government, the military should be advocates.

It was the pressures that came from industrial firms and from some

members of the Armed Services Committees that he resented, and I think he should have.

There was a major campaign at that time which does not seem to exist today to get popular support for that ABM. Of course I am not in a position to see them so I don't know what is going on in the case of the Sentinel ABM.

I am not aware of the same kind of strong forces for deployment. There is a lot of argument for deployment, but I think it is of a different kind. The President was being pressed by representatives of industry. Some companies placed advertisements in the popular press and magazines. Some of them even went so far as to pick out areas of the country where there would be defense jobs for their regional advertising.

If there is that going on now I have not seen it. On the other hand the fact of the matter is that 10 percent of our GNP now is in this aspect of our economy. So even unconsciously this obviously generates a constituency.

So in the most benign sense we have bought ourselves a major constituency. There is another important aspect to this. I think that as people become part of a bureaucracy and are given a job to do, they get caught up in the spirit of getting it done.

I know when I was involved in the creation of the defense technology, and I was for a great many years, I was not in a position to have a balanced perspective.

I can remember putting pressures, myself, on President Eisenhower to do things which in retrospect I am a little ashamed that I brought to bear, because as I got to see how fuzzy the intelligence assessments that I was being fed were, and got to see the problem he was wrestling with as a global problem, I became more and more conscious of the fact that he was much closer to right than those of us who were working on a narrow part of the problem, who felt that our piece of it was the only thing that mattered.

For example, one cannot talk about defending the Minuteman missiles without looking at all of the strategic forces.

I think that it is technically feasible to defend Minutemen, but if somebody asks "Do you have to protect Minutemen," you have to ask against what threat? And I think you can show that the Soviet Union does not have and will not have a force capable of destroying all of the Minutemen, the Polaris, SAC, the European and naval fighter bombers; we are protected in so many ways that it is an absurd thing to spend $10 billion for this inadequate defense.

On the other hand, if you are the man who has the responsibility for the Minuteman, you might want to protect it. It is a question of getting caught up with in the goals of the bureaucracy, not being able to see the other side of the argument or the bigger picture, and in a sense, then it becomes kind of a game. Not in the fun sense but in the competitive sense.

I believe that there is more to the problem than that there are a lot of merchants of death out to sell weapons.

Mr. ZABLOCKI. Dr. Herzfeld.

Dr. HERZFELD. Nowadays, all the ads in the popular press, I think are on the other side of this particular issue.

I think Dr. Wiesner has described it very well.

Mr. ZABLOCKI. Mr. Fraser.

Mr. FOUNTAIN. Before you do that, may I ask one question?

Senator Symington, for whom I have a very high regard, was quoted in the press the other day to the effect that the thin ABM system will ultimately cost $400 billion.

Dr. WIESNER. It might. Though I think people have not reported all of what he said, because they always take the most startling things.

Senator Symington was trying to give a range of possible costs, and he was trying to make an estimate of what a major system could cost if we in fact went that far.

He said that if you take the cost estimates of the present advocates of a large system who say it might cost $50 or $60 billion and you look at the studies of the way costs have escalated on military systems—the Brookings study shows, depending on the system, that costs have grown by 200 percent to 7,500 percent—Senator Symington says if it is 200 percent then this means it will cost the $100 million.

It is a pretty complicated system so it will probably be in the upper part of the range. If you took the factor of seven, it gets close to $400 billion.

He was trying to give you a range of possible costs, with the implication that because of its complexity it is more likely to move towards the upper end, if you are willing to spend that much money, than the lower end.

I think what is more likely to happen is that you would give up in disgust after awhile, before you ever got a complete system, just as we have on the air defense system.

Mr. ZABLOCKI. Mr. Fraser.

Mr. FRASER. Thank you, Mr. Chairman. I would like to address this question to both of the gentlemen. In the Senate debate last year, one of the things that concerned me the most were the statements that were made by Senator Jackson among others, who indicated that the justification of the Chinese threat for a thin system was not the true basis for moving ahead with the ABM system.

I have a high respect for Senator Jackson and also his knowledge about military matters and some of the thinking that is going on in the Pentagon. It seemed to me that what lay at the heart of the Senate debate last year was the question really whether we should begin on the long road of a massive or thick ABM system.

In part I think it is this general posture that has fueled the public debate. Had the administration opened its argument for the ABM by saying at the outset that all we are going to do is deploy a thin system to give us some protection against the accidental or unauthorized launches, there would not have been nearly the debate that has developed.

One still has no confidence about the long term, despite the professions made by the executive branch. This is where I come out. I have come out strongly against the ABM because I have seen in its origins the work of those who advocated the general deployment of an ABM as a major increment to our strategic nuclear posture.

This is more of a statement than a question, but I would like to have the gentlemen's comments on that statement, if I may.

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Dr. WIESNER. I agree with you. It is my considered judgment, and this is a judgment about people's purposes, and probably not a proper thing to do, but I have been close enough to the debates so that I have watched some of the things evolve, I believe that a great many of the proponents of this system, the Sentinel system, would not be proponents if they thought it was going to be forever limited to a thin system.

They might feel that it is better than nothing, but I think a great many of them believe you really need a thick system and that this is the beginning of it.

You evidently would buy the system for the protection it would give if it could be held to a thin system. My own judgment is that that is a waste of money, too, in that there are much better uses for the resources we have, even in the military, than this particular thing.

Dr. HERZFELD. I would like to add a comment to this, if I may. I really cannot say what people want to do. It is kind of hard to look into people's heads. But you can look at what they say and do.

I would like to add to the picture by giving a little bit of the background, which I think is not known publicly, and there is no reason why it should not be, of some of the earlier discussions about thin defenses, in general.

When the issue first came up, I believe, I was with the Advanced Research Projects Agency working for Mr. McNamara, and I was responsible for the ABM research.

We had a study contract with the Rand Corp. to think about strategic uses of ABM, about what is it all for. It was a rather interesting study contract. One of the things that came up in it, and this was 1962, was the following kind of argument: Already at that time it was clear to a number of us that a really thick defense against a really big attack was a pretty "iffy" thing, if at all possible.

It was in the post-Nike Zeus days. Zeus was dead and we were hired out to look ahead, so we did. One of the things that came out of the study was the possibility of looking at other kinds of problems, at lesser threats, which such a system, though differently configured, would be able to handle.

It was somewhat of a solution in search of a problem, if you will, at that stage of the game.

We treated it that way. I mentioned the study rather casually to Mr. McNamara once when I was briefing him on what we were doing.

About a year later he ordered us to study in an intensive way the possibility of a thin defense against less than all-out attacks. This was 1963. We set four very sharp study groups going on that problem in parallel, to make sure we got a wide range of views.

All four came up with varying answers but all agreed that it probably made more sense to look in detail at a system that was designed for less than all-out battle and that there was a fair chance that one might be able to solve this problem.

We went to the Secretary with that study, and for a number of years nothing much happened. I would like to mention, though, one factor, and that is that a number of the professional uniformed people in the Pentagon were very unhappy that we were doing these studies.

They said, "What are you trying to do—undermine Nixe X"? as it was called then. We said, "No, not at all. We are trying to understand all the things it is good for."

But what did come out of all these studies, I believe, was a much clearer insight that, indeed, there are some significant warlike or just prewarlike or crisis situations where it would be useful to have such a system, and that the problem could be solved.

I think it would be wrong for me to claim any kind of credit for what we are discussing today, in any clear-cut way, but this was part of the picture, of the development of the ballistic missile defense in this country. The thin defense is not an idea that suddenly sprang from somebody's head. This is a problem which has been looked at with some care for something like 5 years before the deployment decision was made.

Mr. FRASER. But you understand that in the context in which the decision appeared to be made, it appeared—and I am still not dissuaded despite the good research that undoubtedly went on—that the initial decision was a compromise, not a decision based on a careful analysis of what it really was good for, but it was a compromise between those who were pushing for them—pushing hard for it, and those who were opposed to it.

Dr. HERZFELD. I am sorry, Mr. Fraser, I have to disagree again on this.

Mr. FRASER. Let me give you a little of my own thinking. I heard Secretary McNamara in a closed briefing go through the whole ABM posture not many months before he turned around and gave the San Francisco speech.

He gave no mention then of the potentialities of or usefulness of a thin system.

Dr. WIESNER. May I say something. I think you are both right. Mr. Herzfeld is right when he says very thorough studies were made of the capability of the system.

I think they came out optimistically because they assumed the system would work as it was designed to and I would be willing to bet $1,000, which is a lot of money for me, that it won't on the day it is supposed to be delivered or even 3 years later.

But that is a quite separate issue. It was studied in great detail. I think the political decision was probably taken very hastily. But I don't think that has anything to do with it.

The technical basis for the decision was very, very thoroughly studied, but I don't think it was taken seriously by anybody until they suddenly decided they had to have something as a way of getting started.

This was my judgment at the time.

Mr. FRASER. This is why I don't support the thin system because I am still not dissuaded that the thick system is where we are headed.

Mr. WIESNER. There are better reasons for not supporting the thin system.

Mr. FRASER. Thank you, Mr. Chairman.

Mr. ZABLOCKI. Mr. Bingham.

Mr. BINGHAM. Though not a member of the subcommittee, I appreciate the opportunity of asking two or three questions.

Dr. Herzfeld, in connection with your argument about the usefulness of a thin system as against a threatened attack or an attack from a third nation, C and/or D, aren't there other methods of delivery of thermonuclear weapons that would not be or could not be dealt with by such a system?

For example, smuggling a freighter into New York harbor, or a low-level missile, a subsonic missile, such as the Egyptians used against the Israeli ships?

Aren't there methods that could not be dealt with then?

Dr. HERZFELD. I think this is quite right. No system ought to be made to do all jobs. I think the problems that you mentioned are separate problems, some of which, I think, are relatively easily handled, others with much more difficulty.

I think it is fair to say, though, that there is great pressure on all countries who want to take the step at all to become "members of the club" by having missiles.

That is sort of what it takes nowadays, I guess, to be a self-respecting great power. Everyone seems to be taking that road, whether it makes real sense or not.

Mr. BINGHAM. On the next question, I would like an answer from both of you. Would you comment on the problem of fallout in terms of the use of the Sprint missile, particularly in the vicinity of populated areas, and also the fire hazard?

Dr. WIESNER. The fallout from the Sprint missile, itself, I think is no hazard. I think this is what the Army has said. My best judgment is they are right. The fallout hazard would come in two different ways.

One, if we were—well, the Sprint missile is a kind of anomaly. The present defense system does not depend on Sprint missiles.

It depends on the Spartan doing interceptions in outer atmosphere. They don't have enough confidence in the system to defend itself. so they are putting in Sprint missiles to defend the high-power radars. This ought to be reflected upon a little bit.

The Sprints are only in there to defend the radar associated with the system. But if you consider the next stage, let's assume we were to deploy the Sentinel and that in 3 or 4 years our intelligence was to tell us that the Chinese had built 200 ballistic missiles and that they had enough decoys to confuse the Spartan system.

Dr. Herzfeld and I might argue on whether this can be done, in 4 years, but we would agree it could be done in 10.

In some period of years the Chinese system could if they wanted to clearly overpower the Sentinel system.

I think they could do it soon. He thinks it will take longer. We could say we have made this big investment and we could buy a little more time by putting Sprints around our cities.

We would do atmosphere sorting, the easy kind of decoys to simulate missiles are light balloons that go along in outer space nicely, but they get slowed up as soon as they come to a little air, and the radar can see the differentials in velocities and see that the decoys are not going as fast as the warheads.

Then it is too late to fire the slow, long-range Spartan missile and the Sprints are used to try to get up to the intercept point quickly.

An attacker still has two choices at this stage. He can dump large bombs outside the perimeter radius of the Sprint and generate a lot of fallout. That is why if you build a heavy system you need fallout shelters.

I think everybody would probably agree to that. Certainly we intended to put them up with the Zeus system. There is a second problem

that there can be more of a controversy about but where I think you have to take the conservative point of view; namely, it is possible to fix the incoming warhead which would blow up then before the intercept altitude was reached.

You could do this in a variety of ways. I don't think I will go into them in detail. It is not an easy thing, but it is not an impossible thing to do either.

So instead of having the small, low-yield intercept nuclear weapon which I said would cause no damage, you might have a 1-megaton or 5-megaton bomb explode over your city at 40,000, 50,000, or 60,000 feet and this would incinerate the city.

The fire problem is a problem no one ever has addressed adequately in the ballistic missile defense business because they have not known how to deal with it. But it is there and it is real, I believe.

This is the next stage in the escallation. But it shows what you are getting into if you start. You buy a simple defense which appears useful for a little while. Your opponent easily counters it. So, even with the Chinese we will have entered into an arms race of sorts, though it would be a different kind of an arms race than the one with the Russians.

Mr. BINGHAM. This is a very elementary question. Does what you say imply that the Sprint missile does not detonate the large weapon? It destroys it in some other way?

Dr. WIESNER. No, it would not detonate. It would try, either by the use of the neutrons it emits or X-rays or blast, to destroy it.

Mr. BINGHAM. What happens to it? Does it disintegrate?

Dr. WIESNER. It just falls down on you in pieces.

Mr. BINGHAM. But it does not explode?

Dr. WIESNER. It is destroyed. It is incapacitated so it can't blow up. It may even go on in one piece and land somewhere, but it won't do any serious damage, if you have a successful intercept.

The attacker's task is to be clever enough to know what you are going to do, what the intercept altitude is, or to be able to track your command system or radars, or be able to detect the detonation, to do something that allows his weapon to explode before it is destroyed.

They could have two reentry bodies, one coming in after the other. One is intercepted and the other one is exploded. There is a whole variety of things that can be invented to confuse the situation.

As I say, I don't think this would happen in the first stage but it is an inevitable next stage in a race if somebody wants to take it seriously.

Mr. BINGHAM. Without going into classified information, could you give us some idea of the range in terms of kilotons or whatever it is for the Sprint and the Spartan?

Dr. HERZFELD. I think we are on thin ice here, for a public discussion.

Dr. WIESNER. I think it can be said that one is in the kiloton range and one is in the megaton range. I would not want to say anything more than that.

Mr. BINGHAM. As a matter of terminology at one point, Dr. Wiesner, I think you suggested there might be a difference between a rocket and a missile, or did I misunderstand you?

Dr. WIESNER. We tend to call offensive things missiles and the defensive things rockets, but they really are the same kind of devices.

The intercepting rocket is steered. It has to be guided in flight. The other is on a ballistic trajectory.

The defensive rocket takes off before it knows quite where it is going. The radar is tracking the attacking missile and the computer making a projection of its trajectory, and is trying to steer the defensive rocket close enough that when it explodes it is within the lethal range of the defensive warhead. So the interceptor rocket has to be a guided rocket whereas the other thing is just a piece of inert material that was thrown at you by a missile some thousands of miles away.

Dr. HERZFELD. Could I make a short comment? I would like to disagree with Mr. Wiesner only on one point right now, I guess.

That is I think the fire hazard from these things has been taken into account as best one can, which is not all that bad. Some things are known about it. It is part of the defensive system design. Also the predetonation option of the offense is taken into account.

That is indeed one of the ways in which a defense fails. Defense can fail in all kinds of ways, by exhaustion of interceptors——

Dr. WIESNER. It has been talked about and ignored.

Dr. HERZFELD. I disagree with that completely. I think that is just not correct.

Dr. WIESNER. It is correct.

Dr. HERZFELD. What these calculations, studies, and experiments do show is how good the defense will be, what the price is, and what the attacker has to pay to get through the defense. That is how you calculate it, by taking these kinds of things into account.

I submit they have been taken into account the best one knows how.

Dr. WIESNER. For example, I heard the Army make a presentation to the citizens of a little town outside of Boston.

When asked about the impact of these short-range defensive missiles on the city, they said because they were low yield they would do no harm.

A lady said "Have you calculated the impact of the larger weapons exploding?"

The man looked blank and did not answer.

Dr. HERZFELD. They were perhaps the wrong briefers. It happens all the time.

Dr. WIESNER. I made calculations of the heat on a clear day, not on a snowy, rainy day, to be sure. There would be a great variation. A 5-megaton weapon at altitudes higher than the intercept altitude of the Sprint missile will set almost anything that is flammable in the city on fire.

This is just a fact.

Mr. ZABLOCKI. I think this very technical matter should be pursued by the proper committee of Congress. We are concerned if any of our ABM missiles or any other missiles would be detonated unintentionally on allies, what effect it would have in foreign policy.

This is very interesting.

Dr. WIESNER. I did not realize this would turn into an ABM debate.

Mr. ZABLOCKI. We did not intend so, but it is interesting.

Dr. HERZFELD. There is one subject I would like to mention briefly which I think will interest your committee. We talked for a moment,

briefly about defending allies or friends, or the problem of allies having a defense or friends having a defense.

I think there is a development which is at least potentially feasible, or it seems to me, which the Navy is talking about, and that is to put such a defensive system on ships.

This has some technical problems, of course, but it has the possibility of bringing a defense close to a country like India or Japan, keeping the whole defensive system under U.S. control, so that one does not violate the nonproliferation treaty at all.

It is a U.S. system but it would provide defense for an extended area. Against a small threat, to be sure.

Mr. ZABLOCKI. You presumed one of my questions. I will pursue it later.

Mr. Buchanan.

Mr. BUCHANAN. Dr. Wiesner, you stated in your previous written statement, in describing the basis for the period of stability or relative stability that began in the early 1960's and which continues to the present, as one of the bases which you mentioned, that—

> Continuing research and development efforts brought the new military technologies, rocketry, electronics, nuclear weapons and so forth to a point of maturity from which it was no longer possible to make dramatic changes in the military capabilities of the strategic systems from one technical generation to the next.

In light of the dramatic and at least partially unpredictable developments of the 1950's, which you mentioned in your statement, is it, in your judgment, realistic to state that it is no longer possible to make dramatic changes in the military capabilities of the strategic systems from one generation to the next?

Dr. WEISNER. I puzzled about that statement a lot when I wrote it, and asked myself whether I really believed it. I think one always has to say that there can be a surprise and I don't believe any of us feel we know enough then so that we can't have a surprise of some sort.

But they would not come in the disciplines in which we are now working. We have explored these quite thoroughly. We can tell pretty well what the theoretical yields of nuclear materials are and we can estimate—can improve the efficiency of our bombs.

We can make lighter weight rockets, more accurate rockets. We have explored very hard the military potential of space. I think there were people who thought that space would go way beyond its realized potential as a military medium.

It has been terribly important for reconnaissance and communications. But the whole notion of battles in outer space, the stationing of weapons in outer space, has so far been proved wrong. It has been easy to prohibit these weapons because they look so silly.

We and the Russians were willing to sign an agreement not to station weapons in outer space because when analyzed it turns out to be a not too sensible thing to do.

In unpredicted areas of psychology, chemical warfare, or even elementary particle physics, it is conceivable that something of a breakthrough could emerge. It is conceivable that in the gas laser field where we could get such high energy lasers that a very different kind of defense system than the one we have been talking about here today could be made about which we might all be willing to agree that it

had so changed the present imbalances between the power of offense and defense, that it would be worth spending a major effort on.

I guess I would qualify that statement to say in the mature fields in which we are working, none of us can conceive the kind of breakthroughs that we have had in the past.

If we could see them we would obviously do something about them. I would not want that interpreted as saying that continued basic research could not uncover some new knowledge, which I can't predict at this point, that would make possible a new kind of weapon which could cause the same uncertainties and fears that we had in the 1950's.

I think that that danger, probably a small danger, lurks in a continued arms race.

Mr. BUCHANAN. Dr. Herzfeld?

Dr. HERZFELD. I agree completely with what Dr. Wiesner said.

Mr. BUCHANAN. I just want to point out that in your statement you indicated the long range strategic ballistic missile was still regarded to be technologically unobtainable as late as the 1950's.

When I was a little boy, I thought Buck Rogers was a very wild kind of comic strip.

I am glad to hear you at least modify the statement.

Dr. WIESNER. I used to wake up when I was working in the White House saying if anyone had told me 3 years before that I would even be involved in an argument about the best way to go to the moon, I would have sent them to the booby hatch.

Mr. BUCHANAN. I would like to invite the distinguished gentleman to Huntsville, Ala., where I fully expect dramatic developments in space and even weapons technology for the future if the funding continues.

Dr. WIESNER. That is a question of your definition of dramatic.

I am more jaded.

Mr. BUCHANAN. Thank you, Mr. Chairman.

Mr. ZABLOCKI. To pursue this, there could be alternative ways of protection for our country as well, for example, the SABMIS.

Dr. WIESNER. But it is a very expensive way of doing it.

Mr. ZABLOCKI. Could it be a substitute for the thin ABM missile for the United States?

If it is intended for, as the ABM is intended for, a nuclear attack by China, would the SABMIS be more profitably deployed in every sense of the word against China?

Dr. HERZFELD. I think the basic notion is fairly simple, namely one puts the radar and the missiles on a ship and deploys that ship as far forward as you can against whatever threat you are trying to protect against.

There are a number of applications where SABMIS makes a lot of sense. One would be the protection of friendly countries to whom one does not wish to give the capability directly or who would rather not have them.

I think the Indian Government might conceivably feel better off having protection offshore, rather than fooling around with these things themselves, though I would not presume to judge that in any detail.

Another possibility that one might consider SABMIS for, is a defense of this country in depth, in two layers, as it were. The problem

with that, though, is perhaps it may not be necessary if the attack is small, and if the attack is large SABMIS may not make that much difference either.

I think the reason SABMIS is not a candidate instead of Sentinel is that it is not as far along as Sentinel, since Sentinel is based on research of 10 years, of Nike X and Nike Zeus.

The Spartan has been tested very extensively and a great deal of technology has been thought out. SABMIS now is in a paper study stage with the Navy, and I believe no metal has been bent at all on that system.

The Navy is basically thinking about this, whether this is a system that is worth developing. My understanding is that at this stage there is no major development program authorized.

Mr. ZABLOCKI. My question is this: In your opinion would SABMIS be a sufficient or desirable substitute for the ABM system?

Dr. HERZFELD. As a substitute for Sentinel probably not.

Dr. WIESNER. I don't see that it is even a good defense for some of the countries mentioned. If you take the case of India, for example, some of its principal cities are considerably inland, and close enough to China so that they could be attacked by medium range missiles.

I would imagine this kind of defense would not work at all.

Dr. HERZFELD. I would not have mentioned it if it were not within the range of possibility. It would not be easy to do this, but I think it is close enough, it is worth some study.

One probably could not defend all of India that way, but a very large portion, and certainly could defend a large fraction of Europe that way if one chose to, and certainly all of Japan.

Mr. ZABLOCKI. But as a system which could cause less international repercussions, when we possibly would have to order the slowdown of the next phase, would this system be more feasible than a thin or thick land-based ABM?

Dr. WIESNER. It would cause them—it would take longer to do. It would certainly slow down. It is not even on the drawing board and Sentinel exists as a developed system.

So you would have the debate about whether you should in fact deploy them 10 years from now or 8 years from now.

Dr. HERZFELD. Or perhaps a little sooner.

Dr. WIESNER. If you decided that is what you wanted to do today, the actual existence of the system, as far as funding and constructing is many years away.

Mr. ZABLOCKI. I fully understand, but I think those who are thinking about international relations are trying to find a substitute for, or a replacement for, the now controversial ABM system.

Mr. FRASER. Could I ask a question along that line?

Mr. ZABLOCKI. Please do.

Mr. FRASER. Why isn't the technology transferable? In one case you are using a land platform for the missile launch and for the radar.

In the other case you are just substituting a floating platform. What are the important differences that are involved?

Dr. WIESNER. It has the wrong color of paints I suppose. [Laughter.]

Dr. HERZFELD. I think the differences are a little more substantial.

Dr. WIESNER. It is a different concept. It is a very different kind of

situation. I don't think you could take the Sentinel and put it on a ship and make it work.

Dr. HERZFELD. Principally because the Sentinel components were developed without having to pay great attention to weight or size.

If a land-based radar is 100 feet wide, so be it. On a ship this gives you some real headaches.

Dr. WIESNER. You might squeeze it on to a very large ship, but I think it would be very unsatisfactory. The other question, of course, is how large firepower you could get.

This would be a defense, I suppose, against the relatively modest attacks.

Dr. HERZFELD. But it has another feature in the sense that it is on ships.

Mr. ZABLOCKI. Obviously, it is a system worthy of further consideration. We will go to the next question now.

Dr. Wiesner, if you could, in unclassified terms, describe for the subcommittee the current status of the art in satellite reconnaissance.

Dr. WIESNER. I don't know the current status of the art to describe it. I suspect that if I did, I could not describe it. I don't think I should try.

Mr. ZABLOCKI. My final question is this: Obviously you both agree that the ABM is not a real concern of the Soviet Union, our ABM deployment. At least the point 4 in your statement, Dr. Herzfeld, so states, that the ABM system would not be of such great concern.

Dr. HERZFELD. If it is a thin system. If it is a thick system it might cause considerable concern.

Mr. ZABLOCKI. You did not differ, Dr. Wiesner, so I presume you agree.

Dr. WIESNER. I think then it depends on a variety of things, the nature of the deployment, if it appears to be designed in such a way that it would be easily expansible to a thick system by just adding Sprints, I think it would cause a reaction.

I think it may cause some reaction, but probably a modest one in any event.

I would like to go back to the satellite question because I think I can be a little more responsive then in terms of what President Johnson indicated even without knowing what the current capabilities are. They are obviously, as he indicated, good enough for us to be really sure about the estimates we make of the Soviet force levels and R. & D. programs.

He stated this very plainly a couple of years ago. I presume the systems have become even better.

Mr. ZABLOCKI. Information in that area would be of great interest to this subcommittee because satellites may be our chief intelligence gatherer.

Dr. WIESNER. I think you could get a much more responsive, unclassified, open answer from people who are closer to the field than we are, because there are unclassified systems that are used for surveying and so forth.

Mr. ZABLOCKI. You were so persuasive in your answers so far I thought you knew everything.

Dr. WIESNER. This is a field where I feel what I do know I should not talk about because I don't know the boundaries.

Mr. ZABLOCKI. I will retract the question.

Dr. WIESNER. I am just adding that I think you could get a more responsive answer that would be useful to you from somebody else.

Mr. ZABLOCKI. In view of the answers thus far on the ABM, in your opinion, gentlemen, if the United States and the Soviet Union should enter into an arms control talk, would it be your view that agreement should be sought against deployment of new offensive weapons like the MIRV rather than against the defensive ABM which might provide protection against third countries?

Dr. HERZFELD. May I address this, Mr. Chairman?

Mr. ZABLOCKI. Yes.

Dr. HERZFELD. I believe that at this stage in our relations with the Soviet Union, the only agreements which we can enter reasonably are those whose verification depends on national means alone.

Our own national verification of what the Soviets are doing, and vice versa. It is my personal opinion that neither they nor we are ready for any meaningful onsite inspection of each other.

I am quite convinced that one cannot tell with high enough reliability, and using only unilateral methods, whether country A is deploying MIRV's or not, or whether country B is.

I think it is unfortunate. I very much wish this were otherwise, but, I think that it is a fact of life.

Mr. ZABLOCKI. Then you are, to an extent, giving an answer to my prior question. Our reconnaissance and our intelligence by satellite is not so accurate that we can detect deployment of MIRV's.

Dr. HERZFELD. I would rather stay with my statement the way I phrased it. It was very carefully phrased. I am in somewhat the same fix as Dr. Wiesner, that some of the things one knows one cannot talk about very much in this area.

Your inference is probably substantially correct.

Dr. WIESNER. I think one might get some clues as to whether or not the Soviet has a MIRV system, but I think if they have not tested it they are not likely to deploy it.

So you have at least that handle. You would never be certain. So let us assume that you believe they had not tested one and were willing to enter into an agreement to not deploy them, then I think we would have to face a sort of complicated strategy question of whether we thought it was more in our interests to take whatever risk was involved in assuming that they had not in order to get a more substantial agreement.

I think you can't talk about this in the abstract.

It depends on a lot of other questions. One hope—one would hope that the agreements would be of such a nature that through the years we would also agree to cut back the size of our strategic forces. We don't really know what the Soviet view is going to be on the freeze of an ABM, for example.

They have always been much more defensive minded than we. I have had conversations with Russian scientists about ABM's.

Their views would coincide much more with Dr. Herzfeld's than mine, for example. So I don't think we know at this stage where we will come up.

They may insist that they live closer to China than we do and this is more of a problem for them. So I think our posture has to be very

flexible as we go into these discussions. I think the important thing to remember, which most people don't—we always count weapons and if they have three more than we, we worry.

In my opinion we can tolerate a tremendous latitude in numbers, because I believe a deterrent is the potential destruction of 10 major cities or even fewer on either side, and the forces we have arranged on both sides is so much larger than the capability to do that that you have a great deal of flexibility for negotiating adjustments.

Where you come out depends a lot on the Soviet posture. We don't really know where they stand. I think one thing is clear, that these discussions were our idea.

When Mr. Kosygin visited the United States, Mr. McNamara and Mr. Johnson pressed them very hard. They obviously had not thought about it very much and were not very responsive.

The said they would go back and study it. We know there was a great deal of debating going on in the Soviet Union. I happened to be there in a period when there was a lot of debate.

I debated this issue with a lot of Russians. At the time I debated it, I predicted they would never say yes to a discussion. I was very surprised when they agreed to go to a conference. What they will finally feel their security requires and what they will agree to, I don't think anyone can predict at this time.

Mr. ZABLOCKI. I think they were reluctant about discussing it not because they were not prepared, but because they were amazed that we were so ready for discussion.

Dr. WIESNER. No; I think we have not really worked through some of the intellectual questions.

Mr. ZABLOCKI. Sometimes they hide more than they pretend to know.

Mr. FRASER. Can I ask a supplemental question on that point? The Soviet's announcement of a willingness to enter into these talks followed closely the decision or vote in the Senate.

Many have ascribed the decision by the Soviets to the action by the Senate. I would be curious as to your impression.

Dr. WIESNER. I don't know that anybody can really say. My judgment was that a response was too rapid. It came the next day. They obviously could have been waiting to see what we were going to do.

But as I say I was there several months before and I had the impression that they were in the midst of a tremendous debate about whether they should enter into these discussions and what their posture should be, and so on.

Whether it was coincidence or even deliberate, I don't see how you can tell. Obviously the people who want to believe that the ABM is a cheap and important poker chip will take the position that the Soviet responded to our deployment decision. They may be right, but I doubt it. My personal judgment is that it is not so.

Mr. FINDLEY. Mr. Chairman, I would like to explore for a moment a phrase on page 11 of Dr. Herzfeld's statement. He said:

> The decision is likely to be a close one on either side of this issue.

I think it was yesterday I saw the president of MIT quoted as saying that the two foremost problems of this country are inflation and Vietnam.

He did not list the ABM, Chinese attack, nuclear matters at all. How close is it? We are faced with a serious inflationary problem, and even on a modest side the thin system will involve a lot of money which will have in it its inflationary impact. Is it close enough so that as a citizen, looking at them as a citizen instead of the more narrow scope of the scientist, would you say that today this is close enough so that we can safely put it off until tomorrow?

Dr. HERZFELD. I would not do that. I would go ahead. This is my judgment, taking all kinds of considerations together.

Mr. FINDLEY. So it is not too close a question then.

Dr. HERZFELD. I think it is clear but I think it is close. I think the end of our defense posture would not be involved if we did not deploy it.

I think the existence of the Republic would not be threatened if we did not deploy it. But on balance, I think it is a sound move to go ahead.

I am really sticking with that. On the other hand, because it is not a do-or-die issue as far as I can see, if there are very weighty reasons not to do it I think I could accept such a decision also.

There are some reasons I could think of which could change my mind. But from where I sit now, with what I think is going on in the world, I would go ahead and do it.

Mr. FINDLEY. You don't think inflation is a weighty enough reason?

Dr. HERZFELD. I think the impact of this on inflation is not that large. I am not an economist. But I have talked to economists about this, and they have said don't worry, we have much bigger problems than this.

I think they are probably right. This is part of my point of view. I think if you take the whole GNP and if you consider national economic policy problems, then the thin defense is a pretty small wrinkle.

Dr. WIESNER. If you had to take $10 billion out of the defense budget, would you include this in the items you would take out?

That is if you could not stop the Vietnam war, or putting aside the war.

Dr. HERZFELD. If it were five, I don't know. But it is clearly not a do-or-die issue.

Dr. WIESNER. If you had $10 billion for five items like this—well, that is something else.

Mr. ZABLOCKI. It is my understanding that Dr. Wiesner has a prior commitment and must leave.

Mr. FULTON. Isn't the ABM like standing under an apple tree with your apron out, and someone shakes the apple tree and you try to catch all the apples—but one hits you on the head?

Why isn't that the defect?

Dr. HERZFELD. It could happen, of course.

Dr. WIESNER. The answer is it does not hurt much.

Mr. ZABLOCKI. Gentlemen, thank you very much. You have certainly contributed much to a better understanding of the issues. I only regret we were not able to have you in an executive session, because I know the discussion would be much more frank.

The subcommittee stands in recess until Thursday at 10 a.m.

(Whereupon, at 12:10 p.m., the subcommittee recessed, to reconvene at 10 a.m., Thursday, March 13, 1969.)

STRATEGY AND SCIENCE: TOWARD A NATIONAL SECURITY POLICY FOR THE 1970'S

THURSDAY, MARCH 13, 1969

House of Representatives,
Committee on Foreign Affairs,
Subcommittee on National Security Policy
and Scientific Developments,
Washington, D.C.

The subcommittee met at 10:10 a.m., in room 2255, Rayburn House Office Building, Hon. Clement J. Zablocki (chairman of the subcommittee) presiding.

Mr. Zablocki. The subcommittee will please come to order.

This is the second session in a series of hearings on the effects of space and weapons developments on U.S. alliances and security commitments abroad.

In our first session on Monday we heard an enlightening discussion of the developments of and deployments of the 1960's from Dr. Wiesner and Dr. Herzfeld. Today we will look into the future to discern as best as possible the developments and possible deployments of the 1970's and beyond.

To assist us in that task, we have with us today two outstanding scientists, Dr. George B. Kistiakowsky and Dr. Harold A. Linstone.

Dr. Kistiakowsky is professor of chemistry at Harvard University. He served as special assistant to the President for Science and Technology from 1959 to 1961, and as a special consultant to the Department of Defense until last year. He has been Vice President of the National Academy of Sciences since 1965.

Dr. Linstone is presently the associate director of development planning-systems analysis, Lockheed Aircraft Corp., Burbank; also an adjunct professor in systems engineering at the University of Southern California. Dr. Linstone has been a consultant to the Department of Defense. He is well known for the Mirage long-range defense planning studies which he conceived and directed.

Gentlemen, we are indeed honored to have you with us today. Dr. Kistiakowsky, would you please begin?

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

Dr. Kistiakowsky. Thank you very much, Mr. Chairman.

Mr. Chairman, members of the subcommittee, it gives me great pleasure to accept your invitation and to present to you my observations related to some aspects of these important hearings.

Before I try, as asked, to look into the future, let me say a few words about the immediate past, thus gaining, I believe, a better perspective.

Since the years of World War II, military technology and with it our entire military force has undergone three major revolutions. The first was the utilization of the explosive release of nuclear energy. Thus the destructive power of weapons was increased millions of times, as compared to that from the release of energy of chemical explosives. The second occurred in the means of delivery of weapons: the turbojet engines and the rocket propulsion reduced the time of delivery of weapons by orders of magnitude and greatly extended the range. The third was in the technology of command and control, achieved through the use of sophisticated electronics for communication, display, and automation.

These changes have led to a staggering growth in the military power of our country but unfortunately have not led, I believe, to a corresponding increase in our national security. The main reason is, of course, that some other countries have also made extensive uses of new technologies. Thus, while prior to World War II the continental United States was substantially immune to foreign attack, our country could now be devastated in a matter of hours. Mutual strategic deterrence provides whatever stability there is to nuclear peace. Beyond this necessary but static role, nuclear weapons have almost ceased to be a useful instrument of national policy; their possession provides few additional foreign policy options.

Our experiences in Korea and Vietnam suggest that the use of advanced military technology has other limitations, at least under the conditions of these wars in underdeveloped countries. Perhaps it is not too much to say that the range of enforceable foreign policy choices open to us has not grown as much as might have been expected from the concomitant growth of our military power.

As the members of this subcommittee, of course, know, new technologies and specifically new weapon systems are largely derived from prior scientific discoveries; that is, from what is called basic scientific research. A close interaction between science and technology has evolved in advanced countries, leading to a rapid practical utilization of at least some of the new scientific discoveries.

For instance it took only 6 years to translate the discovery of nuclear fission into the first crude atom bombs and about the same time passed between the discovery of the transistor and the revolution in the performance of electronic computers.

It is very characteristic that the first and crude practical uses of new scientific discoveries involve comparatively little engineering development. Subsequent projects aimed at higher performance of the hardware based on the same scientific principles normally require far greater development efforts. Thus the total cost of the wartime Los Alamos Laboratory was less than the current annual costs of nuclear weapons laboratories and yet the early effort resulted in a dramatic technological breakthrough, while comparatively modest annual progress in nuclear weapons technology is all that can be expected at the present stage.

The reason for this is that there are natural limits to the performance of manmade devices and systems, which are set by the scientific

principles on which they are based. To give an example, the maximum possible release of explosive energy from a fission bomb would be obtained if all the plutonium in it underwent the fission reaction. The highest yield-to-weight ratio would be obtained if the weight of the bomb trigger mechanism were reduced to zero. Needless to say, neither of these objectives is attainable in practice. In fact, the closer the natural limits are approached by practical devices, the more difficult, time consuming, and costly is further technological progress.

Many examples of this can be cited. Compare for instance the costs and lead times of developing successive generations of turbojet-powered aircraft or the costs of the Sidewinder missile with that of air-to-air guided missiles more recently under development.

If one accepts as correct the technical performance data on many weapon systems given in the article of Bernard D. Nossiter (Washington Post, Jan. 26, 1969), who assures us of their authenticity, another significant fact emerges: the more primitive systems of the 1950's came on the average much closer to the originally promised performance than the more advanced items of the 1960's.

These observations refer to all fields in which highly advanced technology is being developed, whether they be military or civilian. To squeeze the last ounce of practical value out of certain general principles is a very difficult task and the development time becomes longer. Look for instance at the problems facing the civilian supersonic transport.

The Congress has become clearly aware of the trends generated by the efforts to develop the ultimate in sophisticated technologies. Its concern is evidenced by searching inquiries into the promised performance data, practical gains derivable from new systems and their development times and costs, when such systems are presented to it for authorization and financing. Even the ordering into a sequence of relative priorities of an almost bewildering array of new proposals that are presented to the Congress in a given general area, say the military technology, is a very difficult task. To draw a line somewhere in such a sequence, rejecting proposals below the line in order to provide adequate resources also for some entirely different purposes, for instance the needs of our society at home, is an even more difficult task. While all of us, no doubt, have strong opinions on how such a division should go, my opinion is based on my personal values and concerns as a citizen and, therefore, it is a value judgment and not any sort of quantitative analysis, which seems impossible to make.

In the announcement of these hearings there is listed a considerable number of potential military developments that might be brought to fruition during the seventies and I would like to add one or two of my own. All of them are based on already known scientific principles, which is very prudent. Even allowing for the rate of progress of modern science and the efficiency of organized development efforts, it is highly improbable that a major new scientific discovery will be made which will result prior to the end of the seventies in the deployment or practical usefulness of a breakthrough in military technology.

Of the items you list, the potential uses of lasers are perhaps the most challenging, because lasers are based on a very recent scientific discovery. As sources of hitherto not readily accessible coherent radiation, they offer rich potential for new military applications of optics. The

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limitations on their use arise at least partly from two factors that are generally known. Clouds, rain and fog form barriers to radiation from lasers just as they to to that from other light sources. Hence to use laser beams reliably over long distances in the open one must use them at very high altitudes, above the cloud cover. The other limiting factor is the low conversion efficiency of primary energy supplied to lasers into the laser beam energy. Thus where very large beam energies are required, for instance as a source of science-fiction-like death rays, the hardware involved becomes very bulky and heavy. This, to say the least, is awkward when the use of lasers is to be at high altitudes.

It is not likely that in the next decade the advances in laser technology will be such that, for instance, lasers will match in efficiency of energy conversion the present thermal engines converting heat into electric power. But this is not necessary for many applications. I am confident that striking advances in this area will be made and that high-power laser beams produced in compact equipment will be a practical reality before the end of the seventies.

You have listed a number of future space systems, most of which require only straightforward but in some cases very challenging, imaginative although extremely costly engineering development to become reality. The question then is not whether they are possible in the seventies but whether their military cost-effectiveness ratio is favorable enough to justify development. In this respect I would place the moon bases at the bottom of the list and at the risk of being facetious would suggest that if all our potential adversaries were to go to the moon I would feel more relaxed here on earth than I do now.

To the space mirrors I also give very low-cost effectiveness rating because of their very questionable military value, coupled with great costs. To gain some idea of these, let us consider an example. A plane, that is flat, mirror might be placed into the 24-hour satellite orbit so that it would provide, most of the time if properly steered, daylight illumination over a particular portion of earth's surface. To provide night illumination equal to daylight the mirror, however, would have to be well over 100 miles in diameter. The illumination would be over an area of about a hundred miles in diameter. One could reduce somewhat the size of the mirror and of the illuminated area by using concave mirrors but there are natural scientific limits to the gains thus obtained. The scope of the project would remain huge.

For projects of this scope and also for projects involving many men in space, that is for the purpose of very frequent launchings of large payloads, the development of recoverable rocket boosters or even of aerospace aircraft would be highly advantageous and economical in the long run. Such development is undoubtedly feasible in the next decade.

It would be, however, costly because of the size of the hardware involved—comparable to Saturn V—and the need to develop highly advanced technology. Before undertaking such a project I would want to be sure that the proposed objective of very frequent multimanned space missions is really essential to our national welfare and that the objectives cannot be achieved in some other way.

In the domain of nuclear weapons I foresee a steady but not a spectacular progress because nuclear weapons technology is already far advanced. What is involved here can be illustrated on the example

of a much older technology, that of chemical explosives, in which I was once actively involved.

The last major new development in chemical explosives was probably the introduction into large-scale use of RDX or cyclonite during the Second World War.

I was slightly involved in this project and, encouraged by it, had subsequently urged intensive research on chemical explosives.

The returns have been very meager because the technology of military chemical explosives has almost reached its ultimate limits.

This of course is not yet the case with nuclear explosives, but such spectacular advances as the transition to fusion from fission weapons during the fifties are extraordinarily improbable in the foreseeable future.

Combining this consideration with what I have already noted about the meager foreign policy gains derivable from the possession of expanding nuclear weapons stockpiles I come to the conclusion that an extensive freeze on further developments through a more comprehensive test ban and other verifiable international control measures would be to our national interests.

Let me now mention a matter not mentioned in the committee documents. Through scientific research extraordinary progress has been made in recent years toward understanding the detailed mechanism of transmisson of gentically determined characteristics in living organisms.

I foresee that in the next decade it will become possible to synthesize in vitro some brandnew specie of virus and possibly to modify drastically the more complex bacterial organisms now extant. Such scientific achievements could bring into the world unfortunately also new and more potent biological warfare agents, tailored to be highly infectious and resistant to countermeasures.

International controls of such manmade agents might be even more difficult than are those of nuclear weapons.

Yet it is within the realm of possibilities that they would rival nuclear weapons in their lethality to man. Clearly it is to everybody's great advantage to prevent by mutual understanding, their use and threat of use.

Since my time is running out let me postpone commenting on the other systems listed by you pending your questions and to conclude these remarks by some general observations.

As a society we have reached a state of technological advance where an incredible variety of new devices and systems has become technically possible.

By possible I mean that we do have the intellectual and economic resources to produce any one of these if called upon.

But to produce the whole array of these possible things is beyond our, and even more so beyond anybody else's, capabilities. Hard choices have to be made as I have already noted.

In the domain of military technology I have heard not infrequently the argument that we must develop this or that system because whatever it is it is possible in principle and hence our potential enemy might obtain it. Such an argument is unanswerable unless one inquires about the more fundamental issue of whether this new thing will so change the balance of power that our security will be en-

dangered. A substantial part of the systems on the list shown to me are not in this category. The security I am concerned with is the possession of adequate deterrence of general war. To plan instead for "winning" such a war, by policymakers, means to me planning the destruction of our society and it does not cheer me to think that other societies, mainly those of our enemies in such a conflict, would end in even greater ruin. However, it is only the planning for such an objective that calls for a nearly unrestrained development of ever more sophisticated weapon systems. Their unpredictable military effectiveness is bound to stimulate our adversaries to counteractions which, if the past is any evidence, will be overreactions and so will call for a further expansion of our own military efforts. I cannot see how the resulting arms race could insure peace in the long run.

Thus I submit that as the strongest Nation we must take greater initiative in striving toward a more peaceful world and as one aspect of this activity to intensify our efforts, not very productive thus far, to reach international agreements on arms control and disarmament measures. Only the progress in this direction can enhance our national security in its real sense, which is the opportunity for free and peaceful progress of our society.

Because of this conviction I have been greatly encouraged by President Nixon's statements that he wishes to move from the state of confrontation to one of conciliation and, as one step in this direction, to initiate arms control discussions with the Soviet Union. I wish him all success.

Thank you very much.

(The biography of Dr. Kistiakowsky follows:)

DR. GEORGE B. KISTIAKOWSKY

Dr. George Bogdan Kistiakowsky, educator and physical chemist, is Professor of Chemistry at Harvard University, a position he first held in 1937. From 1959 to 1961, he served as Special Assistant to the President for Science and Technology.

Dr. Kistiakowsky was born in Kiev, Russia in 1900. He received the degree of Doctor of Philosophy in Chemistry at the University of Berlin in 1925, and came to the United States the following year. He became a naturalized citizen in 1933.

From 1926 through 1928, Dr. Kistiakowsky was a fellow in physical chemistry at Princeton University. He remained there as a research associate until 1930, when he accepted a position as Assistant Professor of Chemistry at Harvard. He became an Associate Professor in this field in 1933 and a full Professor in 1937.

In World War II, Dr. Kistiakowsky served as a civilian with the Manhattan Project under the Army's Office of Scientific Research and Development. He is credited with building the trigger mechanism of the Hiroshima and Nagasaki atomic bombs and with inventing the edible "Aunt Jemima" explosive powder used by the O.S.S. in the war.

Dr. Kistiakowsky served as a member of the President's Scientific Advisory Committee from 1957 through 1963. He has been a member of the General Advisory Committee of the Arms Control and Disarmament Agency from its inception in 1952 to 1969. He is currently Vice President of the National Academy of Sciences.

Among other awards, Dr. Kistiakowsky received the National Medal of Science from President Johnson in 1968. His writings include "On Federal Support of Basic Research," published in *Daedalus* in 1965.

Mr. ZABLOCKI. Thank you.

Dr. Linstone, before you proceed with your abstract of the future weapons and space systems paper you have prepared, without objection, we will make the paper a part of the record at this point.

(The document referred to follows:)

Future Weapons and Space Systems—Comments on Technological Forecasts for the Late 1970's and Beyond

(By Harold A. Linstone, Associate Director of Development Planning-Systems Analysis, Lockheed Aircraft Corp.)

I. INTRODUCTION

I would like to thank the members of this Committee for extending the privilege of participating in these hearings. The picture which I will sketch for you represents my own evaluation and is based on analyses such as the Mirage 80 Study, (1)* a copy of which has been furnished to you.

I do not view a technological forecast as a set of predictions of what will happen. Rather, I consider it to be the result of a dialog between what we can do and what we want to do, the interplay of two kinds of projections: first, the projection of current capabilities into the future, and second, the projection of needs or requirements in the future back to the present. The atomic bomb was the result of a new capability, not of a stated need. On the other hand, an ABM system was first conceived as a future need, rather than as a capability. The old adage "necessity is the mother of invention" fits this second type of projection.

I believe that it is of utmost importance to facilitate the interaction between this Country's needs and its capabilities, and these Hearings can be of great value in stimulating real communications among those who must outline our needs (or requirements) and those who have to prepare to fulfill them—our R&D community.

II. CAPABILITIES

Radar, jet engines, rocket propulsion, nuclear weapons—these R&D achievements of the World War II era formed the basis of today's aerospace technology. Augmented by the computer after World War II, they made possible generations of supersonic aircraft and ballistic missile carrying nuclear submarines.

Taking a very gross look, we observed that information systems have advanced so rapidly in the last decade there is some basis for the claim that the information sciences have wrested the mantle of "glamour field" from the aerospace sciences. Looking farther into the future, there are some clues that the life sciences are the most likely candidate for future leadership, but there is little evidence that this will be reflected in defense and space systems by 1985.

In the following paragraphs, I shall briefly discuss each functional area and ome of the technologies which are expected to have an impact.

A. Strategic Offense/Defense

The contemplation of nuclear conflict created the mission of "deterrence," whereby the threat of assured retaliatory destruction of the enemy's cities prevented an attack on the United States. It was apparent in studies during the late 1950's (2) that—

(1) Deterrence of an attack on the United States by threat of massive retaliation was feasible even if major enemy weapon improvements in the next decade were assumed;

(2) Other total war missions (e.g., "winning the war" if deterrence fails) depended strongly on a defensive capability against nuclear attack on the United States. Such a defense would prove to be an exceedingly difficult task; and

(3) A defense against modest threats could have value.

The principal requirement in the 1950's was the continuing pursuit of R&D to counter any potential enemy achievement (e.g., penetration aids, greater delivery accuracy). It was also found that the quality of the threat was far more critical than the quantity, and that arguments based on the latter (e.g., "missile gaps") could be highly misleading.

A decade and a torrent of studies later, there is little reason to change any of these statements with respect to the coming decade. For 1975–85 advanced strategic missile, aircraft, and submarine delivery systems can be readily conceived to assure maintenance of destruction capability of the enemy's urban complexes

* Numbers in parentheses denote references which are listed at the end of this report. (See p. 57.)

in a second strike even in the event that improved enemy offensive or defensive capability degrades our current weapons.

Greater enemy offensive warhead accuracy and/or yield can be countered by superhardened silos, underwater capsule basing, railmobile and road-mobile missiles, increased dependence on submarine-launched missiles, or air-launched nuclear stand-off missiles. The latter can be launched from manned strategic aircraft which, although they may be vulnerable individually, present an entirely different problem to a defensive system and therefore can assure some penetration. (3)

A breakthrough in submarine detection, classification, and identification capability, which is not apparent at this time, could be countered by missiles which are launched from submarines at much greater ranges from the target, submarines which can operate at much greater depths,[1] and other subsurface missile deployment concepts. New materials such as titanium will play a major role in both aircraft and submarines. For example, glass titanium may be used for pressure hulls to a depth of 20,000 ft. Better integration of airframe and powerplants for air vehicles and underwater mating of submersibles are two of the many future capabilities.

Penetration of improved enemy ballistic missile defenses can probably be achieved by altering either the midcourse or the reentry behavior of the retaliatory missile. There are numerous options: (4)

(1) FOBS (Fractional Orbit Ballistic System) to decrease the enemy's warning time by means of a low altitude orbit.

(2) Lofting or use of a very high trajectory to increase the missile's reentry velocity.

(3) "Bussing" or dispensing of reentry vehicles along the midcourse path of the missile.

(4) MIRV (Multiple Independent Reentry Vehicles).

(5) Blackout of enemy radars by high altitude nuclear bursts.

(6) Missiles which home on enemy ground radars.

(7) Electronic countermeasures (e.g., chaff).

(8) Decoys which saturate the defenses.

(9) Maneuvering ballistic reentry vehicles which have aerodynamic surfaces so that they can pull up, turn, and dive at other targets.

(10) Boost-glide reentry vehicles which use aerodynamic lift and propulsion to effect a low altitude terminal cruising flight.

This diverse menu of options to maintain a second strike capability in the face of technological changes also shows the difficulty of providing an airtight defense against the offensive arsenal of a technologically alert and capable opponent, i.e., the Soviet Union.

Clearly, these options obviate the need to consider seriously the exotic weapon concepts sometimes described in the laterature, (5) such as—

Nuclear weapons which use, rather than suppress, radiation;

Biological warfare in many forms against crops, animals, or people; and

Geophysical warfare, in which one tampers with the atmosphere, the weather, or with elements such as iceflows or induced earth slides.

There is a further reason militating against most exotic weapon concepts: ew do not adequately understand our environmental system, i.e., interactions between its elements, and the use of such concepts could cause irreparable and undesirable damage to the environment.

Turning our attention to defensive systems, we list the following concepts for 1975–85:

(1) Airborne Warning and Control System: The old defense concept of airborne surveillance and interception of low altitude penetrators from above will benefit from much advanced radar technology (including overland coverage).[2]

(2) Advanced ABM: Sea and air-launched ballistic missile defense systems for the late 1970's are under study (e.g., SABMIS).

(3) Active defense of satellites: With an increasing portion of our information gathering and communications, i.e., our "nervous system," out in space, defense of satellites may become a valid military mission in the 1980's. Passive defense might involve redundancy, increased power levels, and more distant orbits. Active defense would favor radiation or particle beam weapons. However, the conversion and collimation of huge amounts of energy, as well as the 1966 Space Treaty, interpose major hurdles to active defense. (6) The Manned Orbital

[1] Four-fifths of all hydrospace lies at depths exceeding 9,000 ft.
[2] The system is also planned for tactical air defense operations.

Laboratory, expected to be operational in 1971, could be an important stepping-stone toward the development of such capabilities.

It should be noted that large chemical or nuclear powered aircraft may have a major impact on the feasibility of concepts (1) and (2).

B. Intelligence and Conflict Control

I have noted that the information sciences appear to be the glamour field for the foreseeable future. Greatly increased speed and storage, as well as decreased size and unit cost, will be the hallmark of the 1980 computer. Large-scale integration of microelectronic assemblies means that 1 square inch slice of silicon may accommodate 50,000 transistor elements. Major gains in input-output devices and peripheral equipment are probable. We will probably also have conversational programming systems. The magnitude of advances in automatic pattern recognition is less certain. This capability is desired to provide near-automatic analysis of surveillance data input from many sources and restrict output to anomalies.

Following are two examples of the impact of this technology:

(1) Computer-aided contingency planning: The Normandy invasion took 4 months to plan. A reduction in the time to generate a military contingency plan by a factor of 10 or 20 is possible. The technology will permit a typical contingency plan to be generated 80% automatically (using only information already stored in the computer data banks), 10% semiautomatically, and 10% by manual or computer-aided procedures. Thus, planning in a crisis can be performed virtually in real time ("on-line") and alternatives can be quickly analyzed to assist the decision makers.

(2) Global surveillance: Continuous surveillance of global air and ocean traffic will be possible. The U.S. Navy's ocean surveillance satellite may also provide sea state and submarine trail concept data. (3) Satellites to detect large-scale movement patterns on land are another possiblity.

The presentation of timely, correct, and properly filtered information to the decision makers itself requires major attention if command and control is not to become an unbearable burden in this environment.

C. Space Exploration and Applications

Inner and outer space will be considered together. The federal programs in these areas have been functions of the "threat," as have been the programs in the defense area. Sputnik launched a major U.S. space program; absence of a deep ocean "threat" so far has seriously impeded deep ocean research and technology. If, in a post-industrial age, our outlook becomes less narrowly land centered, the justification for both inner and outer space programs would be drastically altered. With our current woes of conflict, pollution, and poverty, this day hardly seems near at hand.

The following summary indicates capabilities which appear reasonable for the 1975–90 period.

1. Unmanned Scientific Missions in Space

Continuation of Mariner and Pioneer fly-by probes for studies of the planets (including outer planets) and interplanetary phenomena.

Large Mars landers to land on the planet and return with soil samples.

Venus Multiprobe Buoyant Stations to probe the Venusian atmosphere.

Probes out of the solar system.

2. Unmanned Near-Earth Space Science

Continuing of Orbiting Solar Observatory to gain understanding of solar processes.

Continuation of U.S. Air Force probes to study radiation and materials effects.

Development of the telefactor mode of operation, whereby the man on the ground generates manual efforts in the spacecraft by means of electro-optical manipulator hardware.

3. Unmanned Applications Missions

Continuation of Applications Technology Satellites to study communications, meteorology, and spacecraft technological problems.

Direct broadcast satellite for voice and TV transmission to community receivers in underdeveloped countries (before 1980, a satellite with a two-way capacity of 30,000 to 40,000 voice circuits should be operational).

Commercial operations which require a weightless environment, e.g., automated manufacturing in space of perfect ball bearings and growth of giant metallic crystals in space for semiconductors.

Limited earth weather control system.[3]

Global educational and instant-access information transmission systems.

Extensive mining of the ocean floor with the aid of self-propelled machines and manipulator devices.

Long life reliability will be a central consideration in these tasks. In 1970 we anticipate a mean lifetime of 3¼ years for unmanned spacecraft; by 1980 the mean lifetime is estimated to rise to 5.9 years. (1) Power to operate the spacecraft is another major factor. In the 1970's, isotope thermoelectric, solar dynamic, and reactor thermoelectric systems make their appearance. In the following decade, reactor systems should provide at least 10 times greater power.

Some of these unmanned applications raise serious political problems which can deny their obvious benefits.

4. Manned Missions

The following programs are prerequisites for major new efforts:

Nerva, the nuclear upper stage for heavy payload earth orbital and lunar, as well as planetary and deep space probes.

Deep Submergence Search Vehicle (1973) for recovery of small objects by a four-man crew operating up to 34 hours to a depth of 20,000 ft.

Deep Ocean Technology Program proposed by the President's Commission on Marine Science, Engineering, and Resources for development of technology for deep ocean operations.

The technological possibilities for the post-1975 period include:

Extended orbital research, test, and evaluation operations, using modular stations in 30 to 60 day missions

Extended deep ocean research, test, and evaluation operations, with permanent research laboratories placed at 3,000 to 6,000 ft.; the U.S. Navy is also planning a Large Object Recovery Submarine (1977)

Permanent earth orbiting and lunar bases

Manned Mars landing and return with an eight-man crew and 20 days on Mars (this mission, possibly in 1985, will make the Apollo program look like a grade school exercise)

Occupation of the mid-Atlantic ridge

In considering these diverse possibilities, a yardstick is provided by the space programs of the 1957–67 decade:

There were 40 different unmanned satellites and 12 manned spaceflight programs.[4]

A principal cost factor for both manned and unmanned space programs is the cost to inject one pound into orbit. The answer appears to lie in the cost effectiveness of reusable booster vehicles and this, in turn, depends on the number and value of the "applications" and other space operations.

D. Conventional Warfare

The U.S. military establishment, like its Soviet and European counterparts, is based largely on the evolution of warfare between near-equals which characterized European conflicts from Wellington and Napoleon to Patton and Rommel. Leaving aside the question of relevance of this tradition for the late 1970's, we shall briefly consider the new capabilities which should evolve in the area of "general purpose forces."

1. Strategic Mobility

The ability to deploy U.S. forces rapidly to distant areas has received much attention since 1961. The C–5A transport aircraft and the fast deployment logistic ship (FDLS) [5] represent the capability of the early 1970's. They significantly reduce dependence on overseas bases and theater ports. On the other hand, the resupply or steady state sealift has enjoyed only modest support.[6] Hence, we face a striking contrast in the exploitation of technology.

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[3] Weather forecasting without active modification will, of course, be available earlier. The value of such forecasting for the direction of planting and harvesting throughout the world has been estimated at $15 billion annually in saved crops.

[4] This is equivalent to an average federal commitment of one major manned program at $2 billion to initial operational capability every 10 months.(7)

[5] The FDLS has not been approved by the Congress.

[6] Seventy percent of the ships in our active merchant fleet are more than 20 years old and the average age of trained seamen is 45 years. By contrast, the Soviet merchant fleet has added 1,000 ships since 1950 and is growing by 100 ships a year.

For the 1975 to 1985 period, the following changes may be contemplated:

Integrated planning and control of air and sealift.—Allocation of personnel and goods to embarkation points and carriers, scheduling and routing of aircraft and ships, and other computer-aided control activities should provide far greater speed and flexibility of movement. Compatible containerization for aircraft and ship cargo handling will be an important factor in integrated air and sealift. With such a control concept, intermediate ports, rather than congested theater ports, may be used with cargo transferred from ships to aircraft for movement directly to the most convenient theater air bases.

New aircraft.—By 1985, nuclear aircraft are a distinct possibility, as has already been noted with respect to AWACS and airborne ballistic missile defense. With an aircraft size exceeding that of the C–5A, the nuclear powerplant becomes a prime contender. Current technology indicates that an aircraft cruising at Mach 0.7 to 0.8 and at 36,000-ft. altitude could carry a payload of 300,000 to 425,000 lbs. (8) The principal advantage is unlimited range or mission duration. Like naval strike forces and the FDLS, such aircraft can effect the presence in an area of tension without a prior commitment regarding the use of local land bases. The supersonic transport should, of course, be available in the late 1970's and could be used in certain rapid action (strike or control) operations to transport personnel and light weapons.

Beyond the supersonic transport in the 1985–95 period lies the hypersonic transport (Mach 6 to 12 speeds). At Mach 6, the supersonic combustion ramjet (or scramjet) provides the propulsion. Whereas the supersonic transport may well become practical for distances of 1,200 miles or greater, the Mach 6 hypersonic transport comes into its own at distances of about 4,000 miles. Virtually any large airport on earth can then be reached in a few hours from the United States. (9) An interesting possibility for both the large chemical and nuclear aircraft is the small rapid investigative or control operation deep inland. The combination of very large aircraft and small fixed or rotary wing aircraft provides the capability for rapid movement to any distant area of interest with each large aircraft carrying some troops as well as small aircraft or helicopters. Reaching the precise location, the small aircraft or helicopters are launched in flight from the large aircraft. Upon completion of their task on the ground, they lift off and return to the loitering mother ship for docking and the trip home.

New cargo ships.—Roll-on/roll-off, lift-on/lift-off, and LASH (lighter-aboard-ship) are all available now. Today's level of automation also permits operation of ships with aircraft-type crews. For example, a new cargo ship should operate effectively with three shifts, each comprising four to five men. A future prospect is the nuclear cargo submarine, particularly for fuel (POL) transport.

In summary, technology can give us a new kind of global mobility in the post-1975 period.

2. Tactical Mobility—Land

Improved strategic mobility would be wasted without compatible tactical mobility; advances in firepower and perception as well as in vehicle technology are coming and will be of importance in this regard. The Civil War was a war of movement. The next 50 years saw a large increase in firepower with no corresponding rise in ground mobility. The result was a static war of position, World War I. The Blitzkrieg signaled a jump in road mobility and World War II showed firepower and mobility again in balance. The introduction of nuclear warheads once more alters the picture. Use of such weapons in land combat is likely to lead to either the requirement for far greater battlefield mobility (e.g., 100-mph movement rather than the 15-mph speed of World War II), or a static war of position. (10)

In the underdeveloped areas of the world, which form a global belt around the equator, land mobility is impeded by poor roads. While over 75% of the U.S. Army vehicles are roadbound, 89% of the Eurasian periphery is traversed only by poor roads, if any. (11) These regions have one advantage over the United States: available manpower. Local superiority over this manpower can only be attained by capitalizing on tactical mobility.

The following general guidelines apply to land mobility in the 1970's: (1) If roads are available, or if their construction is justified by anticipated long duration use, trucks provide the lowest cost transportation mode once the initial movement phase is completed. (2) Off-road vehicles can be designed to be particularly useful over most types of terrain for distances of less than 50 miles. Air vehicles are desirable for distances beyond 50 miles, and for lesser distances where the terrain prohibits ground vehicles of any kind.

There are diverse new concepts in land mobility:

Fast wheeled and articulated off-road vehicles can replace slow tracked vehicles.

Compound helicopters and jet VTOL (vertical takeoff and landing) combat aircraft are at hand. Propeller powered tilt-wing VTOL transport vehicles which can fly at speeds of 300 to 400 mph are near. Improvements in noise reduction, all-weather takeoff and landing systems, new materials, and other VTOL concepts will, undoubtedly, widen the potential applications of land mobility markedly in the 1970's.

Heavy lift helicopters for transport of 20 to 30 ton payloads over a distance of 20 nautical miles will be in use.

Before leaving the subject of land mobility, another area of technological impact in the 1970's must be mentioned. Mobility vis-a-vis an opponent may, in fact, be improved in two ways: increasing one's own mobility or decreasing the enemy's mobility.

Advances in sensor technology offer one of the few promising ways in which technology can be brought to bear against a primitive, albeit intelligent, opponent. Sensor barriers, in combination with air mobile troops or homing weapons, may well play a major role in stopping aggression without use of massive ground forces. The frequency spectrum offers many possibilities (e.g., side-looking airborne radar, infrared, and acoustic).(12, 13) Weapons need not be integral with the barrier, hence the barrier can be rapidly emplaced. Such a barrier is readily controllable so that friendly units are not denied passage through it.

3. Land Combat

It should be emphasized that continuation of present U.S. and Soviet policies will mean that much of the land combat capability described here will be in the hands of other countries, i.e., recipients of military assistance.

Air-to-surface and surface-to-surface missiles.—Consider, for instance, an attack on a bridge with a desired 90% probability of success. If bombs are used and the chance of destruction with each bomb is 2%, a total of 115 bombs will be required. If weapon X with 70% probability of success is available, two weapons X delivered in one sortie can accomplish the same task. If the bridge is defended, the value of a reduction in the number of sorties would easily pay for the higher cost of weapon X. If, in addition, X can be launched in a stand-off mode, further gains in survivability are achieved. The Walleye glide bomb, featuring TV contrast homing, is the first of a new generation of precision delivery weapons. Beam riding and semiactive homing guidance systems are likely. For example, the target may be illuminated by a laser beam from a ground transmitter, with the reflected beam providing the beacon for the missile and thus guiding it to the target. (14) Multiple sensors and use of very short wave lengths offer other reasons for prediction of much more widespread use of tactical missiles in the 1975–85 period.

Night operations.—A revolution in ground combat may result from current research on night vision amplification. Twenty-four hour combat operations using shifts of troops may become routine.

Convergence of air and ground operations.—The improvements in antitank weapons will force the future tank to rely more on indirect fire and high-speed dash than on heavy armor. The aerial artillery, exemplified by the Cheyenne assault helicopter, will also develop further. In fact, integral air-ground combat operations are probable, with light, fast, air and ground vehicles used interchangeably for personnel transport, reconnaissance, command and control, and weapon delivery (forward observer as well as missile launcher). Rapid thrusts, probes, and disengagements will then be the rule.

Nonlethal neutralization weapons.—Western traditions differentiate between acceptable and unacceptable weapons. Guns which kill are considered proper; chemicals which only incapacitate temporarily are improper. Nevertheless, recent history has underscored the need for the ability to neutralize without destroying (e.g., Cuban quarantine, Dominican crises, urban rioting). Temporary and humane control of numerically superior crowds and units is likely to be a continuing requirement. Neutralization of personnel may be possible with psychochemicals; (15, 16) barriers and other devices can neutralize vehicles.

4. Sea Combat

The growing Soviet merchant marine and navy and the increasing importance of the oceans as real estate underscore the importance of operations at sea.

If land bases are unusable, floating bases, hence naval task forces, offer a valuable option in support of land operations. Global sea surveillance and advanced air-to-surface missiles may, however, make the floating base almost as vulnerable as the fixed base.

For the 1970's, several new concepts are of interest:

High speed surface craft: Speeds in the 50 to 100 knot range are possible with hydrofoil or pumped air cushion (e.g., captured air bubble) ships. Dynamic lift ships may reach 100 to 300-knot speeds.

VTOL aircraft: Longer range VTOL aircraft for transport and combat permit the use of more and smaller ships as floating bases. Amphibious operations will increasingly give way to air movement directly from the ship to the interior of a land mass.

Modular construction: Construction of ships should provide much increased flexibility. The same vessel can serve alternately as a one-ship ready strike force, antisubmarine carrier, mother ship for high-speed patrol craft operations, or aircraft maintenance base, without lengthy shipyard renovation.

5. Hide and Dash Tactics

One thread seems to weave through the entire discussion of tactical operations. Increased perception (surveillance and target acquisition) and improved firepower place a premium on high speed and on the ability to hide. Although at both ends of the spectrum—i.e., the Polaris ballistic missile submarine concept and the guerrilla—we continually observe the success of "hiding technology," it is surprising how little emphasis has been given to this area. I believe that this tendency may be reversed in the late 1970's and major emphasis devoted to systems for "hide and dash" operations. Camouflage and silent movement are obvious directions. Avoidance of exposed runways will give added impetus to VTOL vehicles. The concept of transition mobility, i.e., the ability to move from one medium (or its boundary) to another, is particularly appropriate. For "hide and dash" tactics, it is important to move from the air to the ground and from the ground to underground; similarly, there is a desire to move from ocean surface to underwater, from underwater to ocean floor, and even from the ocean floor into the subfloor areas. Tunneling and temporary, shallow submergence are two of the implied capabilities. It is also evident that such operations would lead to penetrations of the opponent's territory which are much deeper as well as shorter in duration.

III. NEEDS

In the introduction, I stressed the importance of a proper balance and interplay between innovative thinking about future capabilities and future needs. I would like to emphasize to this Committee that long-range R. & D. efforts face grave, potentially catastrophic, difficulties if the future needs of the nation are not defined by equally innovative people. There are, at present, four problems:

A. Long-range objectives are unsuitable for analysis of needs.

B. Vital "systems" are inadequately understood.

C. There is poor meshing of objectives, environment, and needs.

D. Acceptance of new needs must overcome overwhelming sociological, psychological, legal, and organizational hurdles.

A. Unsuitable Long-Range Objectives

Today's corporation tends to have precisely stated objectives which lend themselves to active planning (e.g., $X million sales in 1975). National objectives tend to be vague, if they exist at all (e.g., peace, freedom). Further, environments and values are in a state of flux. Hence, objectives for the 1975 to 1985 period may differ considerably from those applicable today.

In a recent conference of top strategic planners, one dominant theme emerged:

"To a degree rare in history, world leaders of the next decade will be moving into a great unknown. Rules for world order, written less than 25 years ago, are already wearing out." (17)

The widening economic gap not only splits rich and poor countries, but also separates even more widely the very rich and the rich countries, as well as the societies within them. The growing gap between technological and social rates of chance fosters frustrations and there is growing rebellion against rigid, traditional establishments which are unwilling or unable to cope with this imbalance.

There is an urgent need to hypothesize positive new objectives, to "try them on for size," so that their implied needs may be analyzed. The feedback, in turn, will assist in determining the feasibility of the objective itself.

The wide range of possible objectives and potential needs is readily illustrated in terms of two hypothetical and strongly opposing U.S. candidate postures for 1980 and beyond.

Posture I.—One consequence of the struggles within the United States might be the birth of the post-industrial (or post-mass consumption) state formulated by Professor Daniel Bell of Columbia University. (23) While competition with the Soviet Union is still present in this event, it no longer serves as such a crucial source of objectives for national planning. On an equal basis in Posture I is the concept of the unacceptability of the status quo ante. In this society, technological and social change have been brought into reasonable harmony. Technology has been mastered in the sense that the individual intellect, rather than bureaucracy, has expanded in power and is in full control. This posture obviously presupposes an awesome acceleration of social progress, as well as acceptance of long-range policy planning. Joint industry-government long-range planning may become the rule.[7] (18) Internationally, more subtle and disciplined use of power as an instrument of foreign policy (as in the Cuban missile crisis) is desired. There is less massive dependence on the "threat to national security" as a basis for the creation of needs. Revolutions are no longer considered automatically a threat to the United States.

Posture II.—Since the majority of Americans bask in the highest standard of living the world has ever seen, conservation of the status quo becomes an increasingly attractive alternative. In this posture, decision making is pragmatic, with a minimum of long-range policy planning. The Soviet Union and Communism remain the overriding threats to American security. The widening gaps between rich and poor are considered to be irrevocable. Maintenance of internal law and order is considered of paramount concern. Limited U.S. areas of influence are maintained, if necessary, by force. There are major advantages to this approach. It is almost certainly preferred by the various vested interests over an approach which harbors great uncertainties. A majority of the population, the financial community, labor, and industry, as well as the military, should feel far more comfortable with this posture. Nevertheless, there are problems with Posture II:

A hard line with respect to U.S. policy on poverty may breed more and more violence.

Conventional wars have become more unpopular with each war in this century and the estrangement between youth and the adult management complex (including the government) is deepening throughout the advanced world.

An increasing minority may refuse to accept the "boredom" of a status quo oriented mass production and consumption society.

Another country, e.g., Japan, may decide to strive for Posture I and take on the role of new leader, leaving the United States militarily strong vis-a-vis the Soviet Union, but no longer very influential in the world.

The contrasting objectives represented by these two postures are reflected in the associated hypothetical defense force trends shown in Table I. Neither posture envisions drastic disarmament. However, Posture II implies a greater role for the military in the U.S. culture than does Posture I. With Posture I, new governmental organizations may be created to take over some functions performed within the Department of Defense. Also, joint government-industry planning could be expected to pursue vigorously major new programs such as the space and deep ocean development programs, large-scale regional and urban development, environmental control, transportation, and educational system projects.

Obviously, the difference in objectives and postures has a powerful impact on weapons and space systems in the post-1975 period.

Failure to establish clearly defined alternative objectives is rooted strongly, but not solely, in the other three basic problems.

TABLE I.—*Hypothetical defense force trends in support of—*

POSTURE I	POSTURE II
Total war	
Maintenance of assured nuclear destruction capability in a retaliatory strike	Maintenance of assured nuclear destruction capability in a retaliatory strike
Emphasis on R&D rather than production competition in strategic offense/defense	Large ballistic missile defense system
No concern for quantitative weapon matching	Emphasis on quantitative superiority in all strategic areas

[7] Only France now has a rudimentary joint planning system.

Conventional threats

Reduced general-purpose forces Two year "national service" or elimination of draft and upgrading of professional ("elite") forces Deemphasis of conventional war between "near-equals" Unorthodox responses, e.g., novel land-seabarriers, guerrilla activation	Continuing large general-purpose forces and emphasis on conventional military response Continuation of draft and current type forces; minimal "elite" forces

Underdeveloped country and internal threats

New missions and forces (professional or "national service" draftees) *Examples* Sophisticated barriers Communications/information "warfare" Paraguerrilla units Massive regional development forces for selected areas Large-scale training programs (The last four functions might not be within the Department of Defense) Reduction in conventional military equipment in support of foreign governments and stress on other types of assistance	General-purpose forces used in response Strong riot control capability Continuing emphasis on conventional equipment in military support of foreign governments

B. Inadequately Understood Systems

The following two examples illustrate our difficulties in understanding systems where man, the social organism, is central to the system.

Study of the Cuban "system" led key U.S. decision makers to the conviction that the Cubans would rise up and overthrow the supposedly unpopular Castro regime as soon as the Bay of Pigs invasion was effected.

In Daniel Moynihan's new book, "Maximum Feasible Misunderstanding," he observes that the ultimate source of failure of the community action programs of the poverty war was the application of half-baked social science; the poverty warriors assumed they had a scientific answer when what they really had was merely an interesting hypothesis. (19)

The "systems approach" grew out of the application of mathematics, engineering, and economics in an interdisciplinary fashion to strategic weapons planning, i.e., total nuclear war, in the 1950's. Its success was the result of the well-structured nature of the problems, and the lack of military user experience in strategic nuclear warfare. In traditional European-type "conventional" warfare between near-equals, the problems are not so well-structured. As man's role is far larger, the elements of the "system" and their interactions are not well understood. Military experience, rather than systems analysis, must provide the primary basis for planning.

Unfortunately, Vietnam is neither in the conventional European tradition nor total war, and the needs analyst faces a dilemma: neither military experience nor today's systems analysis provide adequate insight. Worse, the widening economic gap suggests that in the 1980 period wars between nonequals are likely to be the normal rather than the exceptional type. Underdeveloped societies are highly complex systems and man, the social organism, is an overriding factor in revolutionary warfare.

The social and behavioral sciences are making progress; but we still have very serious bottlenecks in research. It is as if we were to build an air defense system while the researchers are just beginning to unravel the fundamentals of wave propagation. For example, corruption, a key factor in underdeveloped countries, still "is almost taboo as a research topic." (20) A recent analysis of 84 countries for the period 1948–1962 has found substance in the hypothesis that the faster the rate of change in the modernization process within any given society, the higher the level of political instability within that society. (21)

Another study has shown that revolutions tend to follow periods of significant improvement which raise aspirations. Subsequent failures then create a gap between expectations and aspirations.(22) This would help to explain the marked increase in riots following the dramatic legislative gains in U.S. civil rights in 1964. We need to do more research in these phenomena, but efforts in this direction have generally been frowned upon by many—including the Congress.

Our inadequate understanding of the system, of its elements, and of their interactions has the result that highly desirable technological advances can have major undesirable imbalancing effects. For example, the transistor radio is revolutionizing the primitive illiterate societies. In Latin America, there are over 39 million radios, about one per family. In Africa, there are at least 6 million. The masses are thus no longer disengated and frustration increases.(21) We simply do not know how to transform such a primitive and illiterate society into an industrial and literate society without creating serious imbalances.

The inadequate understanding of systems, coupled with widely expressed, overoptimistic claims about "technological fixes," is undoubtedly contributing fuel to the flames of opposition to technology as a dehumanizing factor.

C. Poor Meshing of Objectives, Environment, and Needs

A considerable body of analyses of future environments, e.g., Herman Kahn's alternative worlds, (23) exists. However, the translation of these environments into potential missions poses problems.

Lack of creative, innovative thinking has the effect that a new environment will lead to familiar objectives and unchanged missions. The typical organization will study the environments given to it and deduce the need for precisely those missions which it already fills even though a new generation of its hardware systems, or increased quantities of hardware, may be indicated. For example, the objective of combating future guerrilla threats in an underdeveloped region is viewed as giving rise to a need for more divisions and wings of aircraft. A strong, interdisciplinary approach is absolutely necessary to develop new alternatives and challenge old responses.

Ted Sorensen reports (24) that, during the Cuban missile crisis, President Kennedy was presented by the Joint Chiefs of Staff with three conventional alternatives: (1) no action, (2) invasion, and (3) air strike. However, his kitchen cabinet introduced an equal number of unorthodox alternatives: (4) diplomatic pressure, (5) secret approach to Castro, and (6) indirect military action (quarantine). I would suggest that this type of activity can and should occur much earlier, as well as more vigorously, in the planning cycle. And it should have the benefit of inputs from many others beyond the State and Defense Department planners. Somehow the thoughtful or emotional inputs of youth, minorities, and natives of the third world, as well as those of the behavioral, social, or physical scientist or engineer must be considered. The Peace Corps volunteer and the foreign service officer—no less than the teenager and his parents—face a communication gap.

D. Overwhelming Problems of Acceptance of New Needs

I shall confine myself to two aspects of this subject: organizational inflexibility and short-range orientation.

1. Organizational Inflexibility

Success, maturity, and size combine to produce inflexibility. Henry Kissinger has observed:

"The problem of policymaking in our society confronts the difficulty that revolutionary changes have to be encompassed and dealt with by an increasingly rigid administrative structure."(25)

In today's world, the most perfect organization for 1969 is almost certainly a highly imperfect one for 1979. If addition of new organizations is difficult, elimination of obsolete organizations is virtually impossible.[8] It is interesting to note, in the area of defense establishments, that the highly praised Israel Defense Forces are both small and young; furthermore, senior officers retire before the age of 50. Some of the most innovative concepts in the U.S. military establishment have been advanced by small organizations (e.g., Combined Action Platoons). It is food for thought that a country with a very strong attachment to tradition, Great Britain, is lagging significantly in national growth, whereas a country very willing to shed tradition, Japan, is showing most remarkable growth.

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[8] We recall Parkinson's example of the British Admiralty: between 1914 and 1928 Admiralty officials increased in number by 78%, while capital ships in commission decreased by 67%.(26)

2. Short-Range Orientation

Another factor standing in the way of the acceptance of change is the emphasis on short-range planning traditionally favored in the United States. The recent interest in "futures" research in the United States and Europe,[9] as well as these Hearings, hopefully signify greater recognition of action-oriented, long-range strategic and policy planning. As Dr. Erich Jantsch has concluded, government faces "a big jump if it is to assume the leading role in shaping the future." (27)

E. Discussion

The difficulties facing our government and society which I have just described may negate much of the technological potential for the 1970's and 1980's. Vital needs cannot or will not be pursued in terms of technology, and technological capabilities may be implemented which are not needed.

Some actions, such as the following, at the federal level may alleviate this dilemma:

(1) Recognition of long-range strategic and policy planning. If short-range problems are not to drive out long-range thinking, an attitude of long-range commitment must pervade the federal government. Assignment of a top-level federal executive to concentrate fully on coordination of long-range planning should prove beneficial.[10] This planner can—

(*a*) Coordinate the meshing of future objectives, environment, and needs throughout the organization;

(*b*) Initiate consideration of potential new policy objectives;

(*c*) Study feedback from the resulting analyses made at the various levels of the organization;

(*d*) Propose alternative actions to the decision-making bodies;

(*e*) Determine the adequacy of interdisciplinary and innovative thinking at the various levels and recommend improvements; and

(*f*) Receive ideas from external sources (e.g., look-out institutions) and feed them into the system.

(2) Increased exposure to environment and field experimentation. Where traditional military experience and systems analysis fail, ways must be found to create experience and to gain a better understanding of ill-structured systems. Two directions are indicated:

(*a*) A sharp increase in field experimentation programs. Experimental military units (e.g., brigades, platoons) can examine novel missions and concepts of operation.[11] Carefully calibrated social experiments can study the validity of local action concepts.

(*b*) More direct, extended exposure to the environment. This can be accomplished by having men assigned to work directly in the desired areas (e.g., villages) to become familiar with the problems, or by taking into the organization men with such backgrounds (e.g., Peace Corps graduates).

(3) Increased organizational flexibility.

(*a*) Decentralization of very large organizations facilitates innovative planning; it promotes competition which encourages flexibility. Incentives should be provided to managers and officers to keep their organizations small. Decentralization might revive the lost art of "thinking small" in the use of resources for defense purposes. A federal agency inside or even outside the Department of Defense designed specifically to handle low-level conflicts in a truly interdisciplinary way with small resources might prove very efficient.

(*b*) Permanent functional organizations may often be replaced by temporary organizations. Project-oriented groups or task forces normally have this characteristic: they terminate upon completion of the project. Bureaucratic departmentalization was a most useful invention of the industrial revolution, but its rigidity is ill-suited to achieve flexibility. (28, 29) Periodic creation of interdisciplinary teams for need innovation is desirable. Such teams should include not only those experienced in the field of concern (e.g., users or developers of present systems) and creative thinkers, but also individuals who can consider the political, legal, and organizational hurdles which must be overcome to gain acceptance of such new needs.

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[9] Examples: Commission for the Year 2000, Institute of the Future, World Future Society, and new journals—*The Futurist, Futures, Technological Forecasting.*

[10] It is my understanding that Professor Henry Kissinger's role with President Nixon approximates this position.

[11] The U.S. Army's experimental Air Mobile Brigade at Fort Benning, Georgia is an excellent example which led to a real innovative element of our Vietnam experience—the Air Mobile Divisions.

(4) Shifting emphasis in problem solving. The widening gap between technology and the social-behavioral sciences has been emphasized. A greater emphasis on the application of our most creative as well as action-oriented brainpower in the lagging areas is needed to gain a deeper understanding through both theory and experiment. The government can provide incentives to encourage such a shift.

I have stressed the needs side of the technological forecasting coin to emphasize one point: unless we think more seriously about alternative future U.S. directions, translate these into tasks, and tasks into needs, our future decision makers will not have the choice of options which technology could make available.

IV. CONCLUSIONS

Technological forecasting in the weapons and space area for the post-1975 period points to a number of potential issues involving U.S. foreign policy. The most important environmental factor concerning our policies in this era is the phenomenon of widening gaps—between countries and within the United States. These gaps increase frustrations and decrease the ability to communicate. They also mean that conventional conflicts, based on the tradition of wars between equals, become less and less likely.

Global communications may not alter the widening communications gap between different societies. In fact, such communications may have deleterious effects by increasing frustrations. The one bright spot is the global educational satellite transmission concept.

Technology leads us further toward instant global involvement. Global surveillance of air, ocean, and land areas should provide early information on any major movements. Investigative, control, or strike teams can be airlifted directly to the point of interest deep inland and return, without requiring the use of airports in the area. The ability to place people and light arms at virtually any point on earth within hours and to lift heavier equipment and large quantities of troops to any airstrip within a few days provides both capability and danger. It will place unprecedented burdens on the President. Extended airborne and ocean loitering or patrol, as well as surface or subsurface prepositioning of equipment, will be possible, and the independence on overseas bases will be sharply reduced.

"Dash and hide" tactics should be enhanced by shallow and deep ocean hiding, off-road movement on land, underground tunneling, and camouflage, as well as improved reconnaissance, warhead, and weapon guidance technologies.

The most likely source of conventional conflict today is the military assistance which the two superpowers furnish to the rest of the world. In the future, other technologically advanced countries will be able to pour sophisticated conventional equipment (e.g., tanks, aircraft, missiles) onto the world market and become arsenals for the trouble-plagued third world. Proliferation of these weapons can be as dangerous as proliferation of nuclear weapons.

In an era of "cost effectiveness," it is ironic that the Vietnam War is possibly the least cost-effective war this country has ever fought. Nontechnological solutions are of overriding importance and progress in behavioral and social "technology" is relatively slow. Effective regional development efforts suffer under the same weaknesses. Underdeveloped societies are complex, ill-structured "systems." Our ability to help them in balanced growth, in rapid modernization without adverse disruptive effects, remains unclear.

Greater exploitation of outer and inner space, particularly for commercial purposes, is inevitable. The costs and technologies required suggest that only the two superpowers are likely to be heavily committed for some time. Precedent would raise hopes that both outer space and deep ocean areas will remain *res communes*, i.e., in open title.

Top priority should be given to developing insight into needs. We require a true interdisciplinary approach, experimentation, creative small-scale thinking, and above all, dedication. We do not need structure-heavy organizations with giant budgets to support them.

The challenge, in my view, is the achievement of a proper match between technological capabilities and the definition of future needs in a dangerously shrinking world. At the heart of this problem is the deepening chasm between technological and social progress. If we do not meet this challenge, we may have a force which is technologically the most advanced and deadly, but at the same time impotent and obsolete. Planning for "more of the same" in the 1980 period may either constrain American domestic and foreign policies in certain channels

or provide capabilities which are catastrophically irrelevant in support of the preferred policies.

In fact, both we and the Russians could find ourselves in the position of two dinosaurs facing each other in deadly confrontation, oblivious to the tides of change which are rising to engulf them.

Technology must be neither the master nor the uninvolved bystander; it must be the servant of U.S. goals and policies. Positive goals must be set which are worthy of the most advanced nation the earth has ever seen. To this end, imaginative thinking in terms of possible future policy objectives, strategies, and missions must be forced into the planning cycle early. Joint study of tasks and technological capabilities may then enable us to perceive new tasks which should give to Americans the unifying and coherent motivation they desperately seek.

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STATEMENT OF DR. HAROLD A. LINSTONE, ASSOCIATE DIRECTOR FOR DEVELOPMENT PLANNING SYSTEMS ANALYSIS, LOCKHEED AIRCRAFT CORP.

Dr. LINSTONE. Mr. Chairman, I would like to thank you and the members of this committee for extending to me the privilege of participating in these hearings.

I might note that I have furnished to your staff consultant also a copy of one of the classified Mirage studies, which you mentioned, so it is available to you.

Mr. ZABLOCKI (to subcommittee). As your kit has indicated, this study is available for subcommittee members in the committee room.

Dr. LINSTONE. Before plunging in, I am reminded of a statement by which Dante reserved a special place for forecasters, when he said, in his "Divine Comedy": "All forecasters must circle endlessly about a bottomless pit in hell with their heads turned backwards on their shoulders so that their copious tears will flow down the cleft of their buttocks because they tried to look too far ahead."

With some trepidation of the fate awaiting me, I will proceed.

A meaningful forecast must be the result of a dialog between what we can do and what we want to do, between the extrapolation of current technological capabilities into the future and future needs or requirements back to the present.

I will talk about these two aspects and some implications.

First, what about the capabilities?

STRATEGIC OFFENSE/DEFENSE

We found in the studies of the late 1950's that deterrence of an attack on the United States by threat of massive retaliation was feasible even if enemy weapon improvements in the next decade were considered.

We found also that other strategic missions, such as winning the war if deterrence failed, required a defense that would be exceedingly difficult to achieve.

Now, a decade and a torrent of studies later, there is little reason to change these statements. If the enemy develops greater warhead accuracy and/or yield, you can go to underwater capsule basing, superhardened silos, land-mobile missiles, more submarine-launched missiles, or air-launched nuclear standoff missiles, to name just a few options.

If the enemy accomplishes a breakthrough in submarine detection capability, we can launch missiles from a greater range or from much greater depth.

If he improves his ballistic missile defense, we could go to fractional-orbit ballistic systems, lofting, multiple independent reentry vehicles, electronic countermeasures, maneuvering ballistic reentry vehicles or boost-glide vehicles which can cruise at low altitude near the target.

With such a menu there is little need to consider still more exotic concepts such as doomsday machines which have been mentioned in the literature and which Dr. Kistiakowsky has already alluded to.

The information sciences may be considered the glamor field for the period of interest. We will be automating more intellectual

activities. Two examples of the impact of computer technology are computer-aided contingency planning and global surveillance.

In 1980 contingency planning in a crisis can be performed in near-real time and alternatives quickly analyzed to assist the decision-makers. Question: Does this guarantee better decisions?

Continuous surveillance of global air and ocean traffic by satellites will be possible and even large scale movement patterns on land may be detectable.

The critical uncertainty lies in the magnitude of advances in pattern recognition. We want this for near-automatic analysis of the data so that the output gives us only anomalies. Otherwise we will be faced with a data deluge. Another major problem is the presentation of the information to the decisionmakers.

With more of our "nervous system" in space, its defense may become a valid mission in the 1980's. Passive defense by redundancy, increased power levels, and more distant orbits would be the choice over active defense in view of both technical problems and the 1966 space treaty.

SPACE

Let us turn to inner and outer space. Federal programs have been strong functions of the "threat" just like those in the defense area. Sputnik I launched a major U.S. space program; absence of a deep-ocean threat has seriously impeded deep-ocean research and technology.

In the 1975–90 period we can use unmanned spacecraft to explore the entire solar system. Practical applications in inner and outer space, such as automated manufacturing in space and mining of the ocean floor, may have major payoff.

The direct broadcast satellite for voice and TV transmission to community receivers in underdeveloped countries is another example. Global educational and instant access information systems will be possible. Again a question: Will impatience be the result and lead to more frustration and violence in these areas? A charismatic leader can exploit the superior communications that will be available at that time in underdeveloped countries.

For manned missions, we can have extended orbital and deep-ocean research, test, and evaluation stations. In the 1980's a manned Mars landing and return (eight-man crew, 20 days on Mars) and occupation of the mid-Atlantic ridge under the ocean are possible.

Recoverable booster vehicles are the solution to cost problems if the number and value of applications and other space operations is sufficiently high.

Precedents set in the past raise hopes that both outer space and deep ocean areas will remain in open title.

MOBILITY

Integrated planning and control of air and sealift will be attainable with containerization and computer-aided control. By 1985 large nuclear aircraft with unlimited range are a distinct possibility. And the hypersonic transport (mach 6) may be expected in the 1985–95 period.

An interesting possibility for both the large subsonic chemical and nuclear aircraft is the small rapid precision operation deep in a distant

area. All in all, we will be far less dependent on overseas bases than at present.

Improved strategic mobility would be wasted without compatible tactical mobility. Fast-wheeled and articulated off-road vehicles, compound helicopters, 400 mph tilt-wing VTOL transports and 50- to 150-miles-per-hour naval surface patrol craft are just a few of the concepts under development.

Another area of technological impact must be mentioned. Sensor barriers, in combination with air-mobile troops or homing weapons, may well play a major role in stopping aggression without use of massive ground forces.

TACTICAL COMBAT

Much wider use of tactical missiles is anticipated. Multisensor systems will exploit a much wider portion of the frequency spectrum. Night vision amplification may permit 24-hour combat operations.

Convergence of air and ground operations is probable, with light, fast air and ground vehicles used interchangeably. Hiding has been successfully exploited at both ends of the spectrum, by guerrillas and Polaris submarines. Camouflage, silent engines, tunneling, and multimedia vehicles will enhance hiding in the future.

Greater perception, greater firepower, and greater mobility in combination suggest swift and deep, surgically precise, thrusts and equally rapid disengagements. They clearly imply "dash and hide" tactics.

Another technological area of great potential is that of neutralization of personnel and equipment without their destruction. The growing specter of war between nonequals, as well as escalation dangers, lends significance to it.

If we add up all these capabilities we conclude that improvements in transportation, energy control, sensory perception, partial automation of intellectual activities, and new materials will present us with an unprecedented ability to project human presence or destructive power anywhere extremely fast—for instant involvement.

The question: Will it place an impossibly heavy burden on decision-making?

MILITARY ASSISTANCE

Today the two superpowers furnish the bulk of military equipment to the rest of the world. In the future other advanced countries can well pour sophisticated conventional equipment onto the world market and become arsenals for the trouble plagued third world.

The proliferation of these weapons can be as dangerous as the proliferation of nuclear weapons.

I have talked about capabilities. I would like to turn now to the other side of the coin, the needs.

NEEDS

This brief picture of capabilities tells us little unless we can balance it by a look at future needs or requirements. We recall the adage "Necessity is the mother of invention."

There are indeed some gaping holes. A clue is the ironic fact that in an era of cost effectiveness the Vietnamese war is the least cost effective war this country has ever fought.

Instant projection of power will not assure military victory. Even military victory can spell overall defeat, as the war in Algeria demonstrated.

I would like to point to four problems which cause grave difficulties in determining requirements.

A. Long-range objectives are inadequate for needs analyses.

It is urgent that we try new objectives on for size and study the implied requirements to find "good risk" paths to follow.

There is a wider range of possible goals and policies for this country than ever before. The weapons and space requirements depend strongly on the choices made.

Is it desirable to have instant border barriers to stop aggression across lines? Should we have global education systems? Should we have a nation building assistance agency to do the kind of thing we have tried to do in the past in Vietnam in a different way? Should we stress training of others and do war by proxy, if we do it at all?

These are some of the questions which need to be addressed. It is certainly clear that the United States as a post-industrial or post-mass-consumption society has vastly different needs than does the United States as a conservator of the status quo.

The second point is:

B. Inadequately understood systems.

This Nation resembles the sophisticated and successful parent bewildered by his wayward teenager. The parent thinks he knows the problem. And so he never learns about it. He lavishes wealth but little understanding. He talks but does not listen. He thinks he is with it but he does not even make the scene.

Daniel Moynihan observes in his new book "Maximum Feasible Misunderstanding" that the ultimate source of failure of the community action programs of the poverty war was the application of half-baked social science; the poverty warriors assumed they had a scientific answer when what they really had was merely an interesting hypothesis.

Let us consider the popular term "the systems approach." We find that it grew out of the application of mathematics and engineering and economics to total nuclear war in the 1950's.

Its success was the result of two factors:

1. The absence of military user experience, and
2. The well-structured nature of the problems.

Man, the social organism, is not central to such missions. In conventional, or European type, warfare man's role is much larger and military experience, rather than systems analysis, can provide the dominant basis for planning.

But Vietnam is neither in the conventional European tradition nor total war. Neither military experience nor today's systems analysis provide adequate insight. Worse, the widening economic gap in the post-1975 period with which this committee is concerned today suggests that such wars between nonequals must be considered the normal, rather than the exceptional, type.

Still worse, the wider the economic gap the wider the communication gap. The Peace Corps worker and the Foreign Service or military officer have the same problem as the teenager and his parent.

Underdeveloped societies are highly complex systems. We simply do not know how to transform such a society into an industrial, literate one without creating serious imbalances.

The social and behavioral sciences are making progress, but they have very far to go. It is as if we were trying to build an air defense system while our researchers are just beginning to unravel the fundamentals of wave propagation.

We must pursue a truly interdisciplinary approach. We need experimentation, we need creative thinking and, above all, dedication.

C. The poor meshing of objectives, environment, and needs.

At present the typical organization studies future environments and deduces the need for precisely those missions which it already fills.

Lack of creative and innovative thinking leads to the effect that a new environment will result only in familiar objectives and unchanged missions.

Increased quantities of hardware or a new generation of existing hardware may be requested. Future guerrilla threats in an underdeveloped region are seen as a need for more divisions and wings of aircraft.

In his book on President Kennedy, Ted Sorensen relates that during the Cuban missile crisis President Kennedy was presented by the Joint Chiefs of Staff with three conventional alternatives: no action, invasion, and airstrike. However, his kitchen cabinet introduced an equal number of unorthodox alternatives: diplomatic pressure, a secret approach to Castro, and indirect military action, i.e., quarantine.

Innovation in developing requirements must match innovation in technology and their interaction must take place earlier in the planning cycle than it has in the past.

D. Overwhelming problems of acceptance.

I shall mention only two aspects: organizational inflexibility and short-range orientation.

Success, maturity, and size combine to produce inflexibility. Henry Kissinger has observed:

> The problem of policy making in our society confronts the difficulty that revolutionary changes have to be encompassed and dealt with by an increasingly rigid administrative structure.

In a world of changing technology the most perfect organization for 1969 is almost certainly a highly imperfect one for 1979.

It is incongruous that we fear organizational change.

Short-range orientation is traditionally favored in America. Long-range strategic and policy planning is new. It makes us much less the prisoner of external actions.

It is much less dependent on reaction or response to a threat to which we are so accustomed.

There are some ways to alleviate these four difficulties. A recognition of long-range commitment must pervade the Federal Government. Assignment of a top level Federal executive to concentrate fully on coordination of long-range planning at all levels should prove beneficial. He can initiate the dialog, introduce new policy alternatives for study, and help to mesh future objectives with require-

ments throughout the Government. More field experimentation programs will create experience where both military tradition and systems analysis fail. More organizational flexibility can be achieved by decentralization and decompartmentalization. Temporary task forces and project teams show the direction. Decentralization might revive the lost art of "thinking small" in the use of resources for defense purposes.

Let me now restate two of the key issues for national security in the post-1975 period. First, our continuing weakness in dealing effectively with the underdeveloped societies despite rapidly advancing technology. This includes the regional development problem. Second, the capability for instant involvement anywhere on earth.

However, the greatest challenge for America, in my view, is the achievement of a proper match between the technological capabilities and the needs in a dangerously shrinking world. At the heart of this problem is the deepening chasm between technological and social progress. If we do not meet this challenge, we may have a force which is technologically the most advanced and deadly, but at the same time impotent and obsolete. Planning for "more of the same" in the 1980 period may either constrain American domestic and foreign policies in certain channels or provide capabilities which are catastrophically irrelevant in support of the preferred policies.

In fact, both we and the Russians could find ourselves in the position of two dinosaurs facing each other in deadly confrontation, oblivious to the tides of change which are rising to engulf them.

Technology must be neither the master nor the uninvolved bystander; it must be the servant of U.S. goals and policies. Positive goals must be set which are worthy of the most advanced nation on earth. To this end, imaginative thinking in terms of possible future policy objectives, strategies, and missions must be forced into the planning cycle early. Joint study of needs and technological capabilities may then enable us to perceive new tasks which should give to Americans the unifying motivation they desperately seek.

Thank you.

(The biography of Dr. Linstone follows:)

DR. HAROLD A. LINSTONE

Dr. Harold A. Linstone, a specialist in Applied Mathematics, has been Associate Director for Systems Analysis of the Lockheed Aircraft Corporation since 1968. He has been with Lockheed since 1963, his preceding position being Senior Scientific Advisor for Corporate Development Planning.

Dr. Linstone is a naturalized citizen of the United States born in Hamburg, Germany in 1924. He holds the degrees of B.S. at the City College of New York in 1944, Master of Arts at Columbia University in 1947, and Ph. D. in Mathematics at the University of Southern California in 1954.

From 1947 through 1949, Dr. Linstone was an Aerodynamicist with North American Aviation, Inc. From 1949 through 1961, he was employed by the Hughes Aircraft Company, where he became Senior Scientist in 1960. There he directed the first of the "Mirage" long-range defense planning studies. For more than a year, in 1960 through 1961, he was on leave as visiting member of the staff of the Institute for Defense Analyses in Washington, where his work included the study of systems analysis in the Department of Defense.

In the years 1961 through 1963, Dr. Linstone served as Research Mathematician for the Rand Corporation, before joining the Lockheed Aircraft Corporation later in 1963.

Dr. Linstone has lectured extensively at educational institutions, his experience including an Adjunct Professorship in Industrial and Systems Engineering at the University of Southern California. He has also been associated with the Weizmann Institute in Israel, training personnel and initiating work in Technological Forecasting and Planning for Industry.

Dr. Linstone is a consultant to the Hudson Institute, the Stanford Research Institute, and the Research Analysis Corporation.

He has written contributions to *Planning and Forecasting in the Defense Industries*, edited by J. Stockfisch and published in 1962, and to *Technological Forecasting for Industry and Government*, edited by J. Bright and published in 1968.

Mr. ZABLOCKI. Thank you, Dr. Linstone.

As you gentlemen know, we operate under the 5-minute rule. Each member is permitted questions for a 5-minute period.

If time permits, we then ask the members for further questions, again time permitting.

Dr. Kistiakowsky, in your statement you have indicated that we are close to squeezing dry in practical applications the general principles of aerodynamics, nuclear fission, and the like, upon which present weapons systems are based.

Looking even further into the future, what possible breakthrough areas do you see, say by the end of the century, which might have military applications of significant proportions?

It is not our intention to initiate a debate. However, I would ask Dr. Linstone to say whether he agrees with Dr. Kistiakowsky on this point.

Dr. KISTIAKOWSKY. I did not mean to imply that one cannot produce more elaborate and also more expensive, more sophisticated, and complex and also more efficient systems on the basis of present, let's say, scientific bases.

They are possible.

Then what Secretary McNamara used to call the cost effectiveness—and of course he is not the first one to use it—determines whether we wish to undertake these developments or not.

I think Dr. Linstone very effectively emphasized the problems and sometimes uselessness of such developments. When you ask me what are the new scientific breakthroughs on which in turn technological breakthroughs could be achieved, my answer is, "I don't know."

That is of course the characteristic thing about scientific research, that one does not know when the breakthrough will come.

Maybe because I am an old man I am unable to see where these breakthroughs will come. I think personally that, research in molecular biology and understanding of genetic mechanisms, are maybe of the greatest challenge to humanity in the future.

I am not sure whether you are aware that it has been for instance possible already to take a fertilized frog's egg, to extract the nucleus of that cell, and then take a random cell from another frog, a cell maybe derived from the skin of that frog, take the nucleus of that cell and insert it into the denuded ovum, and produce what amounts to an identical twin to the donor frog but a twin in the next generation.

What is possible now to do with frogs' eggs will be possible to do with more advanced animals. If you wish me to be rather reckless, I may point out that someday it will be possible maybe to do that with humans.

I must say that the social implications are rather frightening.

Suppose for instance Stalin or Hitler concluded that for the welfare of humanity it was essential to produce hundreds of their identical replicas into the world.

They would have the political power to do so. I am not sure that from our point of view that humanity would have benefited by that.

This speculation may not be a realistic one but I think that in the field of biology are the most exciting discoveries to come.

Mr. ZABLOCKI. Of course, Dr. Kistiakowsky, you will agree that we have not exhausted all of our possibilities of scientific breakthroughs for the future, even for military use. Is not technological surprise, the nature of it, such that you cannot predict it?

Dr. KISTIAKOWSKY. You cannot predict it.

But I also feel that if you are talking in terms of the limited future, let's say the 1970's, the schedule of development and practical application—that is deployment and so on—is still such that, as I noted in my introductory remarks, the probability of a major scientific discovery which is unforeseeable, and then its practical application to military weaponry, within the 1970's is an extraordinary improbable event.

But one cannot go beyond that.

Mr. ZABLOCKI. Would you care to comment?

Dr. LINSTONE. I certainly would agree with the remarks made. We can project technology into the future but we cannot predict breakthroughs as such.

It is interesting to note that scientific and technological areas, tend to behave like an elongated S-shape in their development.

First there is very slow growth and then there is a rapid increase, with many people getting into the field. It is almost like mining a lode: one miner first discovers some gold, then immediately others converge. In this case other scientists converge into the area. They try to get all the gold out of it. After awhile, the returns are less and less and this is where you get your leveling off.

We have been in a rapid growth phase in the aerospace sciences for the past 25 years. My subjective feeling is that the information sciences, including computers, which took off more recently, are now in the middle of this rapid growth phase; i.e., on the steep part of the curve. I think there are great advances still coming. I certainly would agree that the life sciences may well be the next glamour area, the next to start up on the steep growth portion of the S-curve.

When the Rand Corp. did a study of scientific breakthroughs, by what they called the Delphi method, about 4 or 5 years ago, they asked a lot of experts in the United States and Europe, through questionnaires, where they thought the scientific breakthroughs would come.

If you read down the resulting list of 31 items, you observe that half of them are in the areas of biology and chemistry. I think this lends support to the prognosis.

It is impossible, of course, to make any statements about whether this future life sciences growth will significantly affect military and foreign policy in the next 10 or 20 years.

Mr. ZABLOCKI. Doctor, if I can ask you a question away from the far distant future, to have you comment on something feasible in the foreseeable future. It is a subject in which this committee is particularly interested and concerns dependency on overseas bases.

You commented that in the future the United States will be far less dependent on overseas bases than at present. This goes to the very heart of this committee's concern, I must assure you.

Within limits of nonclassified material, could you tell the subcommittee what your Mirage 80 study disclosed about the feasibility of closing down some U.S. bases abroad within the next decade?

Also, if we closed down these bases how would their defense function be carried out otherwise?

Dr. LINSTONE. We did not look at specific bases. The Mirage studies as such are not designed to determine a best force structure, but to look at the signposts of change; that is, if there is change, which direction constitutes a good risk for planning purposes. Our strategic retaliatory forces will not in 1975–80 depend on overseas bases. But what about more limited operations?

First of all you have rapid deployment capability. In our first study, Mirage 70, finished in 1960, we pointed out that, if nothing were done about it, our lack of strategic deployment capability would drastically curtail our whole conventional warfare capability in the 1965–70 period; much of the equipment would be useless. Then, of course, in 1961, and 1962, after Mr. Kennedy came into office, decisions in this area were made.

You had the C–141 and the C–5 aircraft, large aircraft which have been authorized in the last few years. The FDL, which Congress has not so far authorized, is another aspect.

These are the capabilities of the early 1970's, what you can do. One has the C–5A, one can have the FDL. They will permit very much shortening of deployment time.

There are, of course, questions. Does one permit prepositioning or not? Does the aircraft have peacetime earning power? And so on. Besides the FDL we have roll-on/roll-off ships, left-on/lift-off ships, and lighter aboard ship—there are many possibilities that the Navy is considering and some of which, in fact, commercial users are considering or already operating.

The sum of all these capabilities will mean very rapid deployment and less dependence on specific terminal locations and facilities. Beyond the mid-1970's lies the next generation of aircraft. Even larger aircraft are possible, chemical- or nuclear-powered aircraft, which again increase your deployment capability.

As I pointed out in the written material, our problem is more in the steady state than the initial lift. In other words, we are improving our initial lift greatly, but our merchant marine is suffering. Whereas the Russian merchant marine is being built up, ours is falling further and further behind. As another example of the kind of thing that is possible in the 1970's, we should mention integrated air and sealift, that is, considering air and sea movement together as a single operation.

Let's say you want to go to the Far East. You will recall the discussion in the papers about the crowding of the Saigon Harbor, the overcrowding and delay in unloading ships.

This should become a thing of the past. If you want to go, you can go to intermediate points initially starting the air and sea lift simultaneously from the United States and then, when the first ships arrive at the intermediate port, use airlift from that point right to

the theater, as close to the forward area as you can. This will again increase your capability.

You can do storage not just with the FDL, but in other ways. We will definitely have an ability to be very responsive with or without overseas bases and will likely be limited by the decisionmaking problem. You may have a difficult decision to make. You may have many clauses, and you don't know quite what is going on despite the sensors. That is likely to limit the ability to get things or people to a point rapidly.

Mr. ZABLOCKI. I realize my time is up, but with the permission of the subcommittee I would like to ask another. I know that Dr. Linstone is a scientist more than an expert in foreign policy, but if I could just zero in on a particular overseas base that by 1970 will require a troublesome foreign policy decision.

On the basis of your analysis, could we have your studied judgment on how Okinawa and the possible reversion of Okinawa would affect our national security? In your judgment is Okinawa or the use of that base necessary at the present time or can we indeed agree to reversion, or can we agree to the use of the Okinawa base within certain military limitations without endangering our national security?

Dr. LINSTONE. I would say it is necessary today, and it still will be necessary in 1970, in my opinion, because what I have talked about is not available right now.

For example, there is no FDL. Even if you approve it today, you won't have it for several years; 1970 is very close. I believe we could suffer in our national security if we gave up Okinawa at this point.

However, if you look at 1975 and 1980, it is likely to be a different situation. In other words, it is timewise different. If you plan for it, you have other options at that time.

Mr. ZABLOCKI. My time is up. Did you want to briefly comment, Doctor?

Dr. KISTIAKOWSKY. If I may, sir.

I agree in general with what Dr. Linstone said, but it seems to me that he may not have taken sufficiently into account the broader issues of whether we want to continue being a world policeman or not. If one reorients our thinking in that respect and asks oneself the question, under what conditions a given base or set of bases will be essential for the application of our military power, and whether the application of that military power is really in our interest, then it may turn out that we could make some decisions about reduction in the numbers of our foreign bases, which certainly are extremely costly and create many political problems for us. For instance, as regards the Okinawa base, I am not sure whether the issue is a complete elimination of the Okinawa base, or a transformation of it into the kind of base that we now have on the main islands of Japan.

It is quite conceivable, though I can't go into details here, which are very complex, that the transformation of the Okinawa base into the type of bases we have in Japan will be completely consistent with our national interest.

Dr. LINSTONE. One has to separate the question of capabilities, which I was addressing, of what we can do, and needs, of what we want to do. If we want to reduce out dependence on overseas bases, technology will permit us to so so in the 1970's.

I think I pointed out in my remarks at the outset that the rapid deployment capability has both opportunities and dangers. It has to be looked at in the larger context.

Mr. ZABLOCKI. Thank you.

Mr. Thomson.

Mr. THOMSON. Thank you, Mr. Chairman.

Gentlemen, I noticed that both of you in your prepared statements have referred to value judgments. A decisionmaking process has to become very important. I would like to have your comments on this decisionmaking and value judgments.

Everybody in the Congress, and every civilian, becomes an overnight expert on some of these highly technical questions and make the judgments, or assist in that process.

In the press, Dr. Killian has proposed an ad hoc task force or commission to make a comprehensive study on the problems of weapons technology and strategy and foreign policy.

Do we have any process at the present time to provide guidance and direction in this very important judgment process, or are we dependent on the so-called task forces that make limited studies and leave the evaluation up to people who may have little competence in the field? I would appreciate the views of both of you in this area.

Dr. LINSTONE. The value judgment question is an increasingly important one. The richer we get the more options we have. On the other hand, the widening socioeconomic gaps create more and more constraints.

Basically I like the task force approach just as a personal matter, because I have seen too many organizations become permanent and rigid and inflexible.

On the other hand, certainly you need a great deal of support in translating the results of task forces and in enhancing the dialog between the political, economic, and social aspects, and the technology.

As I say, this is one of the most important things. If this is not done, one becomes more and more a prisoner, rather than a master, of technology.

I think much more in the way of what you might call policy planning can be and must be done. We need a high caliber group which takes the technical and the social, political, and economic issues and stirs them together, suggests new objectives and goals, feeds them not only to the Members of Congress but some of the other relevant agencies to determine what possible responses are. It should concern itself with values, both present and future.

The Air Force, for example, has the Rand Corp. The Army has Research Analysis Corp. The Congress has no such organization. I am not suggesting creation of a great new organization. But you have to have some small interdisciplinary group, at least, to help keep this dialog going, and going early in the game, rather than at the time crises occur.

Dr. KISTIAKOWSKY. Dr. Killian's suggestion was actually addressed to a more limited domain. He spoke, in connection with the hearings on Tuesday on the ABM by the Senate Committee on Foreign Relations, of the need to have an integrated look at our strategic posture, emphasizing that the decision about ABM should not be taken as an

isolated technological development, because it is of much too far-reaching importance.

He was also concerned, and I might say I share his feelings completely, that too many rational decisions are now made, in effect, by experts who spend most of their lives being involved in certain developments; for instance, the contractors working on the ABM for very many years.

He felt a great need for having enlightened, intelligent citizens, without commitments, without, so to speak, vested interest in what is being proposed, to look at this area and try to reach some conclusions.

I would like to amplify that by saying that in these decisions the technical people can only provide one of the inputs. They cannot be the people who decide. The decisions have to be made by others.

Technical people have to be there. They must explain what is involved, what the potentialities are, the costs and the time required, and so on.

But the decisions have to be taken on broader considerations of social welfare for our country, be it the foreign policy or domestic policy.

Mr. THOMSON. With the advanced technology and the sophistication of weapons, and the increasing remoteness of the human mind from the trigger of any device that we might have in our arsenal, isn't the so-called command and control problem a matter of increasing concern to our friends and our enemies, and the management of the weapons that you fellows have devised, an increasingly important matter of concern?

Dr. KISTIAKOWSKY. May I add to your remark about devising these things? We the scientists are guilty, of course. But we have devised them because we have been urged to do so by the policymakers.

Dr. LINSTONE. One might say that this problem relates to the inadequate understanding of the "system." And the matter of command and control is much wider than our nuclear weapon arsenal. It affects the entire spectrum of conflict.

The technologist tends to look at one aspect. He tends to view only certain factors. He is now beginning to learn, via the social systems, the urban systems and others, that our lack of understanding, lack of insight is very, very strong. The more the gap between us and our friends as well as our enemies, widens, the more trouble we have understanding each other.

We are babes in the woods in some of the nontechnical areas. The entire body of knowledge is inadequate to assure good decision-making. I would certainly agree that the command and control problem, the decisionmaking task, gets worse as this gap between technology and the behavioral and social sciences widens. We are more likely to make wrong decisions through misinterpretation and misunderstanding.

Mr. THOMSON. May I ask one further question?

Mr. ZABLOCKI. Certainly.

Mr. THOMSON. I noticed your term sensor barriers. Could you explain that?

Dr. LINSTONE. I have some references quoted, unclassified references. There has been quite a bit of work done, for example, in ways to

detect intruders. And we are dealing here with the frequency spectrum which is very wide.

We have a lot of ways to sense different kinds of radiation, such as odors and heat, and so forth. There are many things we can do in this area in the future. We can put down lines of sensor elements of various kinds rapidly to detect and to track. There is no foolproof system. We are not talking about that. But I think much can be done in this area.

I am not talking about barriers like the Maginot line. I am not talking about big defenses. I am talking strictly about putting down little elements like you do at sea, with sonobuoys to detect submarines.

Dr. KISTIAKOWSKY. In an article in the periodical Science and Technology, there is an article written by Mr. Sullivan, Deputy Director of Research and Engineering for Southeast Asian Problems. He speaks there, on an unclassified level, of a great many automatic sensors which are being used. For instance, he mentions one which is based on smell detection, the detection of ammonia generated by humans which can be detected by highly sensitive devices. He speaks of the very effective use of such automated sensors to indicate the presence of human beings in areas in which, so to speak, their presence is of concern to our military forces.

Without looking at the article, I don't remember which ones he lists as unclassified, so I will leave it with the smell gadget.

Mr. THOMSON. Thank you very much.

Mr. ZABLOCKI. Mr. Findley.

Mr. FINDLEY. Thank you.

Dr. Linstone, you stated that the Vietnam war is the least cost-effective war this country has ever fought. As a military scientist—I guess that would be an apt way to describe you—why do you think this has been so?

Dr. LINSTONE. For the United States the conflict spectrum includes, first, total nuclear war; second, conventional war—from the period of Napoleon to World War II—between near equals, such as groups of European countries. That is the basis of Western military tradition and Russian military tradition and training. Third is the small or the underdeveloped country guerrilla warfare or low-level conflict.

For the first, which was, you might say, an invention of the nuclear age in terms of total annihilation capability, there is no military experience. Obviously, no one has fought such a war, systems analysis could be of help in determining what cost-effective means were, and this analysis was of great value in the 1950's in analyzing the problem. In other words, man as a social organism was not central to the system. Here you could use systems analysis.

In the second type, the conventional or traditional European type of conflict, you could use military experience. With the third kind, at the low end of the spectrum as in Vietnam, you are in a position where man is central, and the nonmilitary aspect of the conflict is more important than the military one. The systems approach, so effective in the total war area, could not nearly be as successful at this other end.

The conventional military experience also is not applicable. This is not a war among European powers, one power block against another,

with people playing by the same rules of the game, who know what "victory" means, who know what "defeat" means, that is, who use the same definitions and the same standards.

You are in an area where neither your systems approach nor your conventional military experience can cover you. This is the basic problem.

Mr. FINDLEY. Could I interrupt to ask: Is the lack of cost effectiveness almost uncontrollable from our standpoint? Is there anything substantial we could do to improve the cost effectiveness of the war?

Dr. LINSTONE. At this stage, of course, there is no sense talking about what might have been.

Mr. FINDLEY. Right, as of today.

Dr. LINSTONE. At this stage you are so committed that I don't think there is much value in trying to talk about other approaches.

Mr. FINDLEY. Do you mean you have—we are stuck with the present policies?

Dr. LINSTONE. You are not starting with a clean sheet. Let me put this same type of situation in terms of the future. I believe that if such a situation occurs, other options should be followed. The thing that we have to learn, which is increasingly difficult for us to do, is the ability to "think small," in terms of the use of resources. Our system, our whole defense establishment, is so gigantic that no matter what button you press, you set a gigantic apparatus in motion. It is very difficult, if you have such a huge organization, to do anything on a small scale.

Mr. FINDLEY. Could I simplify it by saying we have attempted to do too much militarily in Vietnam?

Dr. LINSTONE. I think many people have underestimated continually, the nonmilitary aspects of the problem. As I have indicated, you can even have a military victory and still come out defeated, as the Algerian war clearly showed. So there is not much point in just talking about a military victory.

Here you have a situation where the nonmilitary aspects—for example, creation of a viable infrastructure at the village level—are extremely crucial. In the future one might give some consideration to not trying to repeat the same kind of response, to having an agency which is truly interdisciplinary in nature, where you don't have a complete dominance of the military aspect and the nonmilitary part becomes a small subset of it. But where you have a separate interdisciplinary organization, much smaller, which is strictly professional, which has the various aspects: economic, political, and military in it to work in that kind of environment.

Mr. FINDLEY. Can you see the CIA undertaking such a role?

Dr. LINSTONE. No.

Mr. FINDLEY. Where in our governmental system can you see this developing?

Dr. LINSTONE. It could be within the Department of Defense or outside, but still within the Federal structure. One could conceive of an agency to do that. You might call it a nationbuilding assistance agency or something like it. You must place the emphasis on trying out new ideas and new approaches, with a fresh group of people, and certainly not under the CIA.

Mr. FINDLEY. I am much impressed with your comments about the organizational inflexibility and the short-range orientation with which we seem to be beset in this modern age. I think it is nowhere better illustrated than in our international institutions, NATO, the UN, and otherwise.

The Senate yesterday rejected a reservation to the nuclear treaty offered by Senator Tower, with which I have some familiarity. Under this reservation, our Government would have retained the privilege of assisting in the development of a purely defensive nuclear system for the Atlantic community nations, should this prove some day to be feasible. Yet this was rejected by an overwhelming vote.

To me, this is a system of organizational inflexibility and the lack of long-range orientation.

Would you agree with me on that?

Dr. LINSTONE. I don't specifically want to discuss this proviso of Senator Tower, with which I am not familiar.

You talk about technological change. Our problem is that we change much more slowly than the technology. Our institutions change more slowly. We are not comfortable with change. We tend to find comfort in the same organization. The character of these organizations normally should change as time goes on, because the world changes. You have entirely new factors coming in during the 1970's and 1980's. We cannot predict them, but they are likely to be significant. You have powers like Japan and Germany which may go in new directions. You have many factors coming in.

Mr. FINDLEY. Are you aware of any substantial amount of research being done either in the private or the public sector, into the need for new political institutions going beyond the nation-state level to deal with these massive problems that are being spawned by technology?

Dr. LINSTONE. There are some studies going on at institutions, such as in Santa Barbara, at the Center for Democratic Institutions, and the Hudson Institute. There isn't enough of this kind of thing going on.

Mr. FINDLEY. I know of hardly a thing being done within the public sector. I tried to find out what the State Department was doing in terms of research into political institutions on a supernational basis as compared with the research being done in DOD, for example, in the realm of natural science. It is almost zero.

Dr. LINSTONE. That is exactly right. I completely agree with that.

What we need is the same kind of innovative, creative thinking that we have on the technological side. If we don't have that, we have more and more of a mismatch.

Mr. FINDLEY. Some of us, including our chairman today, have been trying to stimulate interest in exploring a federation structure as one possible answer to these problems. It is pretty hard to get things underway.

Thank you, Mr. Chairman.

Mr. ZABLOCKI. Mr. Taft.

Mr. TAFT. Thank you, Mr. Chairman.

Just following along that line that Mr. Findley has opened up, I think you have been discussing structures, but there is another aspect to this that bothers me that I would like to hear some comments on. That is the whole question of the development of international law on which the structures can operate.

I don't think the mere structures alone are enough. You talked in your testimony about an interdisciplinary approach. Yet it seems to me that the problems are being multiplied in a rate of geometric progression by the scientific developments, with absolutely no progress—in fact, if anything, almost negative progress—in the development of any base of international law or international thinking upon which the institutions are going to operate.

Dr. LINSTONE. I agree with that completely.

Let me illustrate it by an analogy within the United States. One of the problems in any regional transportation system, in the northeast corridor and the urban areas, is this problem of the legal structure. Technology tends to ignore the legal aspects. Cities and countries were not built with technology, including large-scale transportation systems, in mind. Their legal structure is not suitable to accommodate rapid and large-scale technological changes.

Suppose you wish to implement a northeast corridor transportation system. Someone has said that on a clear day from the top of the Empire State Building you see the areas covered by 1,300 different organizations, all of which have a stake in this transportation problem. And all have their legal status and hallowed precedents.

I don't claim, of course, to be any expert in international law. There are a few things that I read, such as lawyers concerning themselves with the deep ocean areas, how they should be handled, when you talk in the 1980's about the ocean resources. How far does the national boundary extend, and so on.

Some open space and deep ocean legal groundwork has, of course, been done under the United Nations. It is not nearly enough. In general, I completely agree with you.

Mr. TAFT. Dr. Kistiakowsky, you made some mention here about genetic change, and that is an interesting problem on down the line. I wonder if you would comment, relating to the subject of today, as to the U.S. alliances and security commitments abroad, on any views you have with regard to what I would call "demographic" problems, the population explosion problems, and how these fit into the picture.

Dr. KISTIAKOWSKY. I have felt for some time, sir, that the population explosion, as it is normally referred to, is a tremendously dangerous problem because one can very easily see natural limits, let's say, even to the production of food, not to mention to oceanic or other natural resources. But it is in the nature of any living population, be it humans or lemmings, that the numbers increase in geometric proportion, so many percent per year. Unless that percentage is dramatically decreased, it is very doubtful whether the human race will be able to live in any kind of comfort, let us say, 100 years from now. Much before then, of course, the have-nots in this world might get pretty much together and go after the haves, which is us, which is Western Europe, Japan, Russia. That conflict is completely within the realm of possibility.

How to control human population is a very difficult problem. Seven or eight years ago we made a study at the National Academy of Sciences. That report was made public in 1962, and actually, I believe, assisted somewhat President Kennedy in his decision modify-

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ing restrictions on birth-control information that might be provided to other nations by the AID.

It became perfectly clear from this study that the controlling factors really are not technological. It is perfectly possible now to provide the means, the technological means, for family planning, for birth control.

As in the other issues that Dr. Linstone spoke about, it is the social factors that are much more difficult to get hold of and control. For instance, the fact that in so many underdeveloped countries the only old-age insurance that a couple has is having plenty of male dependents. They are the old-age insurance. Therefore, to convince these people that they must limit themselves to two or three children is, as they see it, telling them that they can't have any old-age insurance. It is that kind of thing which is exceedingly difficult.

Mr. TAFT. Thank you very much.

Mr. ZABLOCKI. Mr. Buchanan.

Mr. BUCHANAN. Thank you, Mr. Chairman.

Dr. Linstone, I would like to proceed just briefly on a question that the chairman mentioned a few moments ago. In the Okinawa question, the probability is that the choice may be not doing away with the base, as Dr. Kistiakowsky has indicated, but a reduction in its function. And, of course, the very central function of its nuclear capability or the freedom of its use as a base from which we could use nuclear weapons.

Assuming no reduction and no change in our basic posture, assuming we continue to have commitments in that part of the world, and assuming we continue our decision to keep effective military forces there, let me pin down once more: You do not see any viable alternative, looking only at the nuclear capability, not at having some kind of base there, to the retention of this base as it is now?

Dr. LINSTONE. The answer has to be dependent on time, what year. If you are asking me, "Do we need it today?" I would assume we do. I do not have access to the Joint Chiefs' plans, as far as deployment in an emergency goes. I would assume we would make use of it, though I have no way of knowing. I think it would be reasonable to assume that you would make use of it if something happened in the very near future. The time factor is important.

What I am suggesting is that as time goes on and you go through the 1970's, you have a declining importance in bases, provided you explore some of your other alternatives. I don't mean alternative bases like Okinawa, or just another base for Okinawa, but new options.

Don't forget I am basing my answer to your question on the assumption that you want to basically follow the same strategy. In this case, you will want to explore other concepts that provide you alternatives; you might want to go into the integration of air and sealift that I mentioned, using intermediate bases closer to the United States. So, using some of the other options you have, I would say, the importance year by year in the 1970's of that kind of a base should decline.

Mr. BUCHANAN. Thank you, sir.

Thank you, Mr. Chairman.

Dr. KISTIAKOWSKY. I wonder if I may comment.

Mr. ZABLOCKI. Please do.

Dr. KISTIAKOWSKY. It seems to me that Dr. Linstone is a little bit too cautious here because the center of our nuclear strength has been shifting toward missiles in the past. We do not need Okinawa for our missiles, whether land launched or submarine launched. In case we need shorter range aircraft, we still have the aircraft carrier from which they can be launched. When it comes to aircraft like the B–52's, we have other bases, like Guam, which are perfectly feasible points of departure for these bombers.

I have a strong feeling that while the Okinawa base complex was completely essential for our strategic planning when it was first organized and strengthened, the nuclear use of Okinawa has possibly already become obsolescent.

Mr. BUCHANAN. Thank you, sir.

Mr. ZABLOCKI. From your hearings Tuesday I certainly came away with a definite impression that a prime problem in the past, in our relations with other governments, has been a lack of accurate intelligence. Of course, this lack could always lead to miscalculations, and it has in the past.

This leads me to a question, Dr. Linstone, and it relates to your statement where you note the increasing sophistication of our satellite reconnaissance capability. Could you elaborate on this area of technology, explain a bit more about the possible need for defense of these satellites?

Dr. LINSTONE. What I said is that there is a possibility. For example, if you were going to put your entire nervous system, so to speak, out in space, it would become a very prime target. So either you don't do that, or you would have to prepare to defend it.

The capability of surveillance will certainly increase, as you have indicated, and, as with the other technical capabilities, it brings both added knowledge, added capability, and, on the other side, added uncertainties or added dangers.

You have several aspects. You have the sensing problem, sensing things that go on. Then you have the processing of this data, transmitting the data to the ground or processing it up there. You have the interpretation of this data. Much will depend, I think, on what progress we make in what we call pattern recognition in these areas—being able to see without having a man running through every picture, as we have done in the past, trying to study a picture to see what it says.

We will get a tremendous amount of data, we will be deluged by data, and one of the problems we will have will be our ability to handle that data. Additional data does not necessarily automatically mean additional knowledge. A data glut does not mean you are much wiser. If you look at Pearl Habor, and much has been written about this, it wasn't a matter of not having enough clues, you had a tremendous number of clues, but it was another problem: if I put clues A, B, and C together, I get one implication; if I put clues D, E, and F together I get another implication. Which is more reasonable? You would still have problems of this type. So with your presumably much more rapid knowledge of certain things that do go on, you also will have problems of false alarms, of thinking there is something there when there isn't, or some action taking place when there isn't. You have problems in both directions.

I think the net result should help the decisionmakers, but it is not an undiluted gain.

Mr. ZABLOCKI. You have implied that computers could be of some assistance in this area. Would you venture to say that the computers can be employed for accuracy?

Dr. LINSTONE. I have mentioned, of course, the routine information handling in the contingency planning area. There is a tremendous amount of routine information which has to be in the system, and this the computer can handle accurately even with today's technology. The hope is that the computer can increasingly take different kinds of output from different sensors, not just the visual but also other sensors, and by looking at all this together and comparing it with past data of the same area, correctly see if there is any change and only report and give a signal to the man if there is a change detected. The computer will be much faster than the man, but it can also be fooled at times. I think a computer can do a great deal. Its problem is not lack of accuracy, but lack of intelligence.

Mr. ZABLOCKI. Doctor, you said that the greatest challenge for America is the achievement of a proper match between the technological capabilities and needs in a dangerously shrinking world, one in which the chasm between technology and social progress is deepening.

You say that planning for "more of the same" that we had in the past, in the 1970–80 period may either constrain American domestic and foreign policies within certain channels, or provide capabilities which are catastrophically irrelevant in support of a preferred policy.

Would you care to amplify about what channels? What do you foresee?

Dr. LINSTONE. We are already constrained by nuclear capabilities. As has been often pointed out, we and the Russians are like two people in a telephone booth. Anything that we do, because of our nuclear capability, already has implications, even though we are not talking about using them in particular situations. But it causes us to act differently. One should be opening up the dialogue and innovate in the area of policy for future situations that may develop. What are some of the options that we would want the decisionmaker to have to maximize his flexibility?

I mentioned the Cuban missile crisis and the quarantine. That was an unorthodox response rather than the familiar one, bombing. I would lable the alternatives of bombing or invasion as "more of the same."

I would try to come up with more subtle responses. I think we should move as much as we can toward permitting options which signify a more subtle use of power.

Mr. ZABLOCKI. Gentlemen, from your testimony I gather that both of you agree that we do need imaginative thinking in terms of possible future policy objectives.

Dr. Kistiakowsky, you have stated very clearly that to reach international agreement on arms control and arms measures is highly desirable.

May I then ask a final question: If you gentlemen were called upon by the President to advise him on preparing an American position for arms control talks with the Russians, what general principles might you recommend? Dr. Kistiakowsky?

Dr. KISTIAKOWSKY. I think that the general principle would have to be that the agreements involve such measures that can be verified by unilateral intelligence. In other words, I think that any agreement which requires international teams of inspectors, and so on, to go and visit here and there will not be a workable agreement. They haven't been in the past and they won't be now. However, as Dr. Linstone noted, and as is very well known, technological capabilities for unilateral intelligence have been rapidly expanding. In other words, not the Mata Haris, but more objective ways of getting that information.

Nothing is perfect. Intelligence is not perfect. And of course, one always has to bear in mind when considering such agreements that danger of cheating exists. Hence we must be able to shape the agreements in such a way that major cheating will be detectable. We must also bear in mind however that we are not dealing with a situation where we are now safe but become subject to some dangers if we reach an agreement. The plain fact is that we are not safe now.

So it is a question of a balance of the degree of dangers which would exist with and without such agreements. I think that so much can be determined by unilateral intelligence that gradually very significant arms control measures could be achieved. I don't know how far one can go into the domain of arms reductions. These are more difficult steps.

Mr. ZABLOCKI. To deal specifically with the ABM, the deployment of the ABM is easily detectable, is it not?

Dr. KISTIAKOWSKY. Of the kind of ABM's that have now been conceived, yes.

Mr. ZABLOCKI. That the Soviet Union has. There is no question they couldn't hide them.

Dr. KISTIAKOWSKY. No, they could not.

Mr. ZABLOCKI. Couldn't we get an agreement on ABM's as a start?

Dr. KISTIAKOWSKY. Similarly, one can't hide deployment of such missiles as Titan or Minuteman. They are just too big. They are unmistakable, as unmistakable as anything. So it isn't that ABM is particularly easy to observe.

Answering your question specifically, yes, one could reach agreement on ABM alone.

Mr. ZABLOCKI. On ABM, in your opinion, Dr. Kistiakowsky, why do you think the Russians have initiated that system?

Dr. KISTIAKOWSKY. There is a very strong tradition in Russian military thinking about the importance of defense of the homeland. You will find it, for instance, in the tremendous scope of their antiaircraft defenses. They invested in defense against aircraft, proportionately speaking, far more than we did with our SAGE and other systems. I think the urge and decision to develop ABM is a kind of logical extension of that military tradition. I know that Russian senior people who have been involved in their military programs and so on until some time ago took the very strong position that defense is a sacred right on which there can't be any limitations imposed. The Soviet Union took it also in more formal discussions.

So I am sure that they must have pushed the ABM projects as soon as they became aware that we were quite serious about developing our missile forces.

It is very interesting to note that this attitude has changed. As you know, even one of their big-shot generals in a public speech stated that, "We know perfectly well that our defenses aren't perfect against the missile attacks."

Mr. ZABLOCKI. Do you contend, Dr. Kistiakowsky, that the Soviet Union has initiated the ABM system as a defense against the United States or China? It was also implied yesterday that the ABM system could also be not only a defense system for the Soviet Union, but an offensive arm against China.

Dr. KISTIAKOWSKY. I do not see how it could be an offensive arm against China, As you know, of course, the Soviet Union has a variety of offensive missiles of various ranges, from the intercontinental range to the intermediate range and less presently deployed against the NATO countries, and presumably against China, which is quite accessible to even intermediate range missiles from the Siberian hinterland.

I don't see why the ABM system should be used for offensive purposes. It is a very specialized, extraordinarily complex system, with comparatively short range missiles, a system specifically designed to hit a bullet with a bullet, so to speak. You raise the question as to against whom, against whose attack ABM was developed. I would guess, and this is only a guess, that it was developed primarily against an American attack, because at the time when the technical work began on ABM systems the political tensions between the Soviet Union and China weren't nearly as great as they are now. But that is only a guess.

Mr. THOMSON. Might I ask a question?

Mr. ZABLOCKI. Yes.

Mr. THOMSON. Since you are guessing about the Russians' thinking, why did they denounce America the other day, publicly, for thinking of deploying ABM systems and insist that it was an escalation of the arms race, when they deployed a system which apparently they thought was simply defensive?

Dr. KISTIAKOWSKY. I only saw a short item in the paper and I am not a professional psychiatrist, so I wouldn't dare to get into another guy's mind. It may have been just a political judgment that this was a useful political bit of propaganda at the moment.

As Mr. McNamara has stated, the Russian system was limited to that around Moscow, and was even incomplete. I am afraid I am getting into awkward areas for an open meeting.

Mr. ZABLOCKI. We understand.

Dr. Linstone, would you care to advise the subcommittee as to what you would advise the President?

Dr. LINSTONE. On arms control?

Mr. ZABLOCKI. What should be the American position on the arms control talks with the Russians?

Dr. LINSTONE. My own view is that I am in favor of the talks. I don't think anyone likes to see an uncontrolled arms race. At least most of us, I think, are agreed on that.

There are some concerns that I have. For example, R. & D.—research and development—is much more difficult to detect. What R. & D. is going on on the other side? I don't agree with a statement

made some time in the past by Professor Wiesner, that there is a technological plateau in this area. I don't see any signs of a plateau although we may not get tremendous new kinds of capabilities, as pointed out by Professor Kistiakowsky.

Nevertheless, there are a lot of things that can be done on both sides. That is one thing that I would be very concerned about, the R. & D. aspect.

Another thing that I would be concerned about is not looking at this in a vacuum, as United States and Russia alone. In this time period you are getting to the situation where other countries, and not just China and France, but other countries, in the 1970's and certainly by 1985 there may be a dozen countries, could have nuclear capability. This can be extremely embarrassing to either the United States or Russia. I shudder to think what would happen if China gave nuclear weapons to the United Arab Republic, for example. Politically, the idea of displacing Russia as the influential power in the United Arab Republic might be a desirable objective for the Chinese. This kind of thing concerns me. I think we have to worry about Japan and Germany in this time period. These are big powers.

We also have to worry about some of the things Professor Kistiakowsky mentioned earlier, the biological-chemical concepts which can be easier in the long run for some of the other countries to implement and can put the two superpowers in a very peculiar position.

Mr. FINDLEY. Dr. Linstone, you placed emphasis on R. & D. Dr. Kistiakowsky has just stated he doesn't think it is very practical for us to try to seek arms control agreements that involve onsite inspection.

I think that is a fair interpretation of what you said.

Dr. KISTIAKOWSKY. Yes.

Mr. FINDLEY. Do you agree with him? If you do, how can we possibly have any meaningful agreement on controlling R. & D.?

Dr. LINSTONE. I don't have a good answer to this. I think the R. & D. may just have to continue. The main thing is the production—can we control that?

Again, I think ultimately the world is bigger that the United States and Russia. The thinking has to shift in the longer time frame. We want to be flexible. We worried about Russia all along as the number one threat. It still is today. But we better take a good look at this time period, at what else there is. To that extent I think we probably have to push the R. & D.

Mr. FINDLEY. Are you optimistic about reaching agreements on arms control that are worthwhile?

Dr. LINSTONE. All I can say there is that when and if things are in the interest of both countries, agreement is possible.

Mr. FINDLEY. But even assuming the interests of both major powers coincide, if they each have the unilateral means of detection as to what the other is doing, what is the importance of the agreement? They would know what is going on on the other side of the fence in the absence of an agreement. A slowing down of the arms race would be conceivable if both parties wanted that to happen.

Dr. LINSTONE. Yes, it could be. The values of an agreement go far beyond the technology. You are getting into the sociopolitical nuances

that might be offered by an agreement. On that I would just as soon not comment. But these are important factors.

Dr. KISTIAKOWSKY. I wonder if I may add a few words to what Dr. Linstone said in response to your question, Mr. Findley.

I don't see how one could put restrictions on R. & D. without perfectly unrealistic site inspection. But I think one should emphasize the fact that as the weapons systems become more and more sophisticated, the problem of deployment becomes very important and difficult as you know, for instance in connection with the F-111. Time is passing. In other words, the possibility of a kind of an overnight surprise is becoming totally unrealistic. You said what is the use of an agreement. I think arms control limitations needn't all be embodied in the treaties. Much of it can be done by mutual understanding. But this understanding requires talking, otherwise you couldn't have it.

I personally feel that so long as our society is strong at home, which of course is the primary requirement in my way of thinking to remaining a strong nation; so long as our society is strong at home, we can do an R. & D. job that is as good as anybody else's. And it doesn't mean that we have to have deployed the entire spectrum of weapon systems, as I tried to say in my preliminary remarks.

For instance, the possession of a secure nuclear deterrent means that even a potential enemy in possession of new biological weapons will have an extraordinarily hard time deciding to attack us with those weapons. In fact, it would be a totally irrational, insane decision.

Mr. ZABLOCKI. Mr. Fulton.

Mr. FULTON. The question on the ABM is whether it is not based on a historic concept that is now out of date. This historic military concept would be the artillery concept of shooting from point to point on the earth's surface. When we talk of intercepting or destroying in space, that artillery concept does not apply. The defect of the ABM to me is that its first reaction to the space vehicle which is unidentified is an act of war, although it might be for peaceful purposes. That is, we take military action to destroy it even though we have now no means of identifying what kind of a capsule or space vehicle it is, nor its purpose.

The trouble with the ABM to me is that we are trying to stand under the apple tree with our apron out. Somebody shakes the apple tree and you can catch every apple, except the one which hits you on the head, so you are done in.

My point is that we should develop rules of the road in space, in the way we have developed them affirmatively in every activity from ships, planes, and automobiles, to radio and television. Now we should have them for space capsules and vehicles. If we would proceed like that through the United Nations in an affirmative way, we could then tell what were the usual operations and what were the unusual, threatening operations.

The difficulty is that there is no discernment between types of capsules.

I would say to the chairman when we get the thousands of capsules now in prospect, communications, weather, spy, earth resources, of every kind and variety, even orbiting between cities in fractional orbit, then it becomes a matter of impossibility to inspect or to intercept in the context of destruction without advance knowledge of some

kind which we don't have. Nobody can tell which is a nuclear-purposed or nuclear-nosed capsule at the present time in fractional orbit, or even in IRBM. So the difficulty you come to is that if there is an enemy who wants to confuse you so that you let your guards down, or wants to trap you into an act of war with a country that you really don't want to be at war with, it would be very easy to saturate putting up one capsule with skins or with portions of skins—because the radar will pick it up if it is just a half or quarter of a cylinder—and then one capsule fragments into 200 to 500 separate capsules, possibly in the same plane of orbit.

You can't tell which one of these 500 twins has the Toni. How do you tell it? The ABM system, then, to me, at the present level of technical development is good for research, but I doubt whether the deployment should be made.

Can I ask you: If you are undecided on deployment, you wouldn't say deploy and take the chance on the ABM system?

If the ABM system is still in doubt as to effectiveness or technical adequacy, the answer on deploying is no. Is that not right?

Dr. KISTIAKOWSKY. I very much agree with you, Mr. Fulton. It is an exceedingly complex problem, and I certainly don't envy anybody who has to make the final decision, considering all the technical, political, domestic and foreign, considerations on the effects of deployment.

In other words, what will happen as a result of deployment. On balance, I came to exactly the same conclusion you have; namely, that it is much better not to deploy at present, although I think that R. & D. in the field certainly has to continue. For one thing, with a very effective R. & D. program in that field, it will tell us what are the capabilities of the offense. By working on defense, you also learn what the capabilities of the offense are. So, as I stated Tuesday in the Senate hearing, I recommend against deployment at the present time for many reasons.

May I come back to another very important point you made, Mr. Fulton, on this whole problem of intercepting satellites which as you say may be an act of war. I think it would be extremely unfortunate if somehow the international tradition went in the direction of saying any satellite, any object in outer space is fair game for intercept. I think anything we do in that direction would be very much against our national interest.

Mr. FULTON. As a matter of fact, it would be returning to the tribal level, that anything you couldn't identify or find out what it was within the area of reference in which your tribe operates or in that geographical area should be killed.

Dr. KISTIAKOWSKY. That is right.

Mr. FULTON. So I believe it would be back to the tribal practices.

One further point is: Why don't we use methods of intercept that would simply put these vehicles into a parking orbit until we could talk? For example, we might go up with nuclear rockets, and infrared, even, to divert them maybe from the reserve seats even though they are in the ballpark.

That would get them away from the reserve seats that are vital to each country's interests.

Dr. KISTIAKOWSKY. That is, I think, a rather tough proposition. The satellite has so much kinetic energy of motion, it moves so fast, that to change its orbit requires, in turn, a very major application of energy.

Mr. FULTON. I agree with you, if you are changing the plane of orbit. But within the same plane of orbit it would not take too much energy for the landfall, the termination point, to be variable for a city so that it would not cause enough damage to be noticeable.

One other point is if we look at the methods of launch that we are customarily using—if we went from 25° to maybe 38° above the Equator inclination at Cape Kennedy, and they at the launch sites kept their launches between, say, 55° and 70° inclination above the Equator, neither one of us would be over any territory of any consequence to the other, and as long as they were in that orbit we could ignore them, which is were most launches are now. Why isn't that possible?

Dr. KISTIAKOWSKY. That, of course, would prevent the use of satellites as intelligence gathering devices, both for them and for us.

Mr. FULTON. But I am getting in an area where we don't bother with them. If they launched in that area, we would just ignore it, or rather, the converse.

Dr. KISTIAKOWSKY. I feel, on the other hand, very much that this freedom of space for nonoffensive purposes is an extraordinarily important principle. President Eisenhower, as you recall, urged the adoption in 1954, I think, of the principle of freedom of the skies. That, of course, was totally rejected. One can see why, because at that time we were the only Nation that had the technical capacity of making use of such freedom of the skies for observation. Now several nations, certainly two, and by a stretch of credibility there may be some European nations also, have the capability of using outer space for observational purposes. I think it is terribly important to preserve that written or unwritten part of international law—I am not sure which it is—because that, in the end, has the same objective as the freedom of the skies.

Mr. FULTON. I agree with you. I am always amazed to hear people say, "We could have an agreement on the antiballistic missile if we wanted it."

The answer is we do have a treaty with the U.S.S.R. and many other nations on limiting the use of outer space to peaceful purposes. Secondly, on the treaty, we have an agreement not to orbit weapons, military weapons, weapons of mass destruction, or nuclear weapons, in outer space, nor to use the moon or any celestial body as a base. We already have that agreement.

If you look at the current situation, we aren't too badly off in the United States. However, I believe that we in the United States may become the first to violate that treaty, because the Air Force is now proceeding on its manned orbiting laboratory. What do you say to that? We have the manned orbiting workshop under NASA for peaceful purposes, and to develop an orbiting vehicle of large size. But the Air Force has its separate military program, which is so secret they won't tell the average Congressman. The potential exists that they will put in orbit military weapons of some level of destruction.

If I were the U.S.S.R. I would be afraid they were either nuclear or mass destruction, because the Air Force is not dumb. What do you say to that?

Dr. KISTIAKOWSKY. Fortunately for me, I haven't been made privy to the Air Force plans, either, so I am unable to answer your question.

Mr. FULTON. That is all, Mr. Chairman.

Mr. ZABLOCKI. This interchange was very interesting. My only hope is that the consideration that we give to the effect of the ABM system on international stability, was equaled in Moscow prior to the deployment of an ABM system by the Soviet Union. But we can't be sure of that. To some degree, I agree with my colleague, that we should not violate the agreements on space, yet there is some concern on my part that freedom of space for only peaceful purposes is difficult to insure.

How can it be enforced? We have an agreement, that is true; but the Air Force fears Soviet Union intentions of using a space platform for military purpose in space. Therefore, to the extent one power permits violation the other will, naturally, respond. I wouldn't condemn the Air Force without first of all shaking a finger at the Soviet Union for its intentions in exploring the possibility of space for military purposes.

Mr. FULTON. Mr. Chairman, one more point that Dr. Kistiakowksy brought out was on the Russian ABM system. There is no doubt, and it is pretty general knowledge, that they did try to ring Moscow. I am not allowed to disclose, but in several other cities they tried it. But they have never gone further. So when the Russians have not proceeded with the completion of their ABM system for themselves, doesn't it sort of give us an example that maybe they have, when they were starting to deploy, found it wasn't worthwhile to go further?

What do you think of that?

Dr. KISTIAKOWSKY. It seems like a logical conclusion.

Mr. FULTON. Maybe we ought to check, because they are not completing their own purpose, which they started out with, and told the world pretty much about.

Mr. ZABLOCKI. I would be the first to say that the Soviets made mistakes before and we should not repeat their mistakes.

Mr. FULTON. It makes the mistakes easier if you see someone else doing it first.

Mr. ZABLOCKI. If I may ask one final question as I see the time is rapidly running out.

Dr. Linstone, you made a very interesting observation, about the direct broadcast satellite for voice and TV transmissions to communities in underdeveloped countries. This poses an interesting question to me. Wouldn't we be in effect invading the rights of a country if we did so? Would there not have to be international agreements in order to properly do so?

If we did so without an agreement, would we not, in effect, be triggering a propaganda war?

Dr. LINSTONE. That is right. It has obvious problems, like any of these uses, even the use of space for resource surveys.

I agree that there would have to be some kind of international arrangement, because you just can't go and broadcast propaganda.

In fact, even under ideal conditions you have to worry about the incorrect use of this type of concept.

Mr. ZABLOCKI. It would be possible that we might not limit our beaming to an underdeveloped country. We could be beaming to a very developed country.

Dr. LINSTONE. That is right. It could also be misused by someone else, such as a charismatic leader somewhere misusing it.

I would hope that one could at least use this type of concept for very beneficial purposes, for educational purposes, that you could beam programs in many languages, just like we use our educational television here, and possibly better, using it more effectively, so that you bring the classroom to any place in the desert or the jungle.

I think this is really what ought to be stressed in this thing. It has to be very carefully done.

Mr. FULTON. Do you mean bring the miniskirts to the jungle?

Mr. ZABLOCKI. If I may facetiously comment, Great Britain already did that. They brought them to the United States.

Dr. LINSTONE. One of the problems that I worry about is that if you use the TV programs as we are used to them, and they are available to every underdeveloped area, this, in fact, increases the frustrations of these people. They get the image of the average American home with two butlers, and an upstairs and downstairs maid, and they are no longer in idyllic isolation. They see what they have, they see what they don't have. Here, again, is an example where technology, if you are not careful, can potentially also be a disservice. You have to do it very carefully and thoughtfully. I would hope that it could be used to great advantage for educational purposes.

Mr. FULTON. There is one point: When the chairman says propaganda war, that sounds like we are going to make a clattering, first, and second, jamming. Actually, when we get maybe 1,000 or 1,500 orbiting vehicles and have computerized systems with line-of-sight radio or TV waves, it would be impossible to jam. So it would make an open world the way Dr. Kistiakowsky said.

As Mr. Eisenhower said, it all automatically became open and possibly not subject to any regulation whatever. I don't know how you would regulate it. Do you, Doctor?

Dr. LINSTONE. I can see the difficulties and I don't have a good solution to it. But the dangers in misuse have to be worried about. Consider the technology of the future. You look at some of the Rand forecasts and go to the year 2000, and you are concerned not only about subliminal advertising but a lot of other possibilities. I don't want to predict when we will have them. But, again, you have a capability and a danger.

Mr. ZABLOCKI. As a matter of fact, a conference is being held in Washington at the present time by Intelsat. This could be an organization for the regulation of satellite information dissemination.

Dr. Kistiakowsky.

Dr. KISTIAKOWSKY. I felt that your remarks, Mr. Chairman, were very much to the point. I just wanted to remind you of an event, I think, about 2 years ago, when General de Gaulle didn't like some transmission by our communication satellite and forbade the French state-controlled TV system to rebroadcast it. Of course, once you have

direct broadcasting to the individual's receiving sets, this sort of thing becomes impossible.

I quite agree with Mr. Fulton that jamming may become exceedingly difficult. While I don't know about propaganda warfare, what I am sure about is that the use of this means of spreading information, or misinformation, by the great powers will only increase the resentments that the less powerful, less technically advanced countries have against us, and, incidentally, against the Soviet Union, So I share very much your conviction that very careful international understandings have to be reached.

This is an example of a general trend, that the state of completely sovereign nations is being destroyed by advances in technology. Nations now interact with each other through so many ways that were never contemplated when the concept of this complete sovereignty was developed in international law.

If I may point out, there is a very interesting set of papers just released by the National Academy of Sciences prepared for the Policy Planning Council of the State Department on the potential impact of science and technology on future U.S. foreign policy.

It brings out very clearly this complex pattern of new problems.

Mr. ZABLOCKI. Thank you for calling our attention to those papers, Dr. Kistiakowsky.

On behalf of my colleagues, I want to thank both of you gentlemen for not only appearing before this committee, but giving such succinct and direct answers to the questions.

I want to assure you that we have learned much, and the basics that we are getting in scientific developments will be very helpful as we proceed in these hearings, as we try to find new answers for Congress and our Government to questions of future foreign policy to insure our national security.

Thank you very much, gentlemen.

That will conclude the meeting of the subcommittee.

(Whereupon, at 12:40 p.m., the subcommittee was recessed subject to call.)

STRATEGY AND SCIENCE: TOWARD A NATIONAL SECURITY POLICY FOR THE 1970'S

TUESDAY, MARCH 18, 1969

House of Representatives,
Committee on Foreign Affairs,
Subcommittee on National Security Policy
and Scientific Developments,
Washington, D.C.

The subcommittee met at 10 a.m. in room 2255, Rayburn House Office Building, Hon. Clement J. Zablocki (chairman of the subcommittee) presiding.

Mr. Zablocki. The subcommittee will please come to order.

This is the third meeting in a series of hearings by our subcommittee. The topic for this morning's discussion is the effect of space and weapons developments on U.S. alliances and security commitments abroad.

The first two sessions, as you recall, were devoted to a discussion of the weapons in space developments and deployments of the 1960's 1970's, and beyond. Today we move from a consideration of weapons and space systems, the hardware so to speak, to the effects which scientific and technological advances have had or will have on strategic thinking and national security policy.

To discuss this very vital subject, we are privileged to have with us today two of America's outstanding authorities in strategic planning, Mr. Herman Kahn and Dr. Thomas Schelling.

Mr. Kahn is director of the Hudson Institute at Harmon-on-Hudson, N.Y., formerly with the Rand Corp. He is one of the founders of general methodology for strategic decisionmaking, which is widely used by our Government. Through such works as "On Thermonuclear War" and "Thinking About the Unthinkable," Mr. Kahn has helped shape national defense planning for more than a decade.

Dr. Schelling is a professor of economics at Harvard University and a member of the faculty of the Center for International Affairs at Harvard. He is a consultant to a number of Government agencies and organizations concerned with national security. Like Mr. Kahn, Dr. Schelling has influenced America's strategic thought through his work and books, the most recent being "Arms and Influence."

It is my understanding, Mr. Kahn and Dr. Schelling, that longer statements will be inserted into the record and you will summarize your presentation.

As you know, we operate under the 5-minute rule. At the conclusion of your statements, the members of the committee will ask questions for 5 minutes per member, and return to the members desiring to ask

further questions at the conclusion of the round of questions by each member present.

Further, if either of you gentlemen has a biography that you would like to present to be included, it will be placed in the record. If you will supply that to the clerk, he will be very appreciative to you.

Gentlemen, we are pleased to have you with us today.

Mr. Kahn, you may proceed.

STATEMENT OF HERMAN KAHN, DIRECTOR, HUDSON INSTITUTE, HARMON-ON-HUDSON, N.Y.

Mr. KAHN. The title of my paper should be "Some Current Defense Doctrines, Issues, and Debates." I have a fairly thick document here. I only want to summarize, I think, the major issues that concern us today.

If the Chair would like to turn to page 4 of the document, it illustrates, quite graphically, the first issue I would like to talk about. On page 4 I have listed in rather barebones fashion the technology of central war or strategic war in 1951, 1956, 1961, 1965, and 1970.

Anyone examining these lists, who understands the operational characteristics of the systems described, will immediately notice that the change in the art of warfare was greater in each of these 5-year periods than occurred, shall we say, form the Civil War to World War I, or World War I to World War II, or World War II to 1951. So any experience—or psuedo-experience from thinking—gained in any of these periods could be quite misleading in the next period.

In planning new systems we ought to plan, as we will see in a moment, 10 to 20 years ahead. Our thinking tends to be at least 5 years behind, so we tend to be 15 to 25 years behind the requirements. One first reaction in trying to cope with a problem like this is to simplify the issues in some way. I think it is a sound instinct, but it also can be misleading.

The basic conclusion which most people have come up with is what we call finite deterrence, which is a simple concept, and which if valid and practical would succeed in reducing the complexities. The basic concept is to have a simple and balanced finite deterrent composed of invulnerable offense forces and no defense forces around cities. Neither side's missiles can destroy the other side's missiles and thus either side can always destroy the other side's cities.

It is quite clear that under those circumstances, it is most improbable that any nation would launch an all-out salvo of missiles because the almost inevitable result would be mutual homicide. This deterrence of all-out attack is the most dramatic problem, and finite deterrence does sort of solve it. Indeed, it seems to most a good solution.

It also has another great virtue. If both sides adopt this solution, it would seem to stabilize the arms race. Once one has "overkill"—to use a loose word—one does not need to go further.

Finite deterrence seems to have a third great virtue: Many of its proponents, at least implicitly, believe one does not need to think about these issues any more. Once one has arranged for a contingent but automatic mutual homicide, the deterrence is settled—at least if one has the finite deterrence view of the world.

There is a fourth great virtue: Finite deterrence is relatively inexpensive.

It has a number of other great virtues which I will not go into. Anyone would think that this amount of virtue would reign unchallenged, and it does. But finite deterrence happens, I believe, to be very dangerous, both as a picture of the world and with regard to the strategy it leads to.

Beneath each of the technology charts on page 5, I have another chart—an issue chart that indicates some of the issues that arose in each of these periods. I don't want to spend time here discussing these issues. They would take a great deal of time. It is interesting to me, though, that there is, in some sense, a lower level of discussion today of many of these issues than was true 8 or 10 years ago.

While many of us understand more today about some issues, many concepts that were widely understood 8 to 10 years ago are no longer understood and must be explained even in a rather sophisticated discussion. This does not occur accidentally. If one can't cope with the kind of a change shown on page 5, he tends to forget about it. It is just too hard to keep working on this seemingly endless and insolvable problem.

This position would seem to be perfectly reasonable for the man in the street, a mother or a householder, but not for the Government or the technical experts, the man responsible for policy. He has to think the problem through. He has to recheck his concepts and doctrine every year.

There is another point I might mention. Most people, even experts, tend to be against almost anything that changes the strategic picture. It is interesting to note, if one looks back at the debates of the fifties, most people who were interested in arms control were terrified at the thought of the new ballistic missiles. Their deployment appeared to create an absolute increase in danger. The missiles could easily be kept on alert—available for use in a matter of seconds—and they required only about 20 to 30 minutes to reach their target. They looked much more dangerous than bombers to most people.

Today almost everybody is clear that the change from bombers to missiles probably increased the safety of everybody concerned, at least for the past decade and the next decade. But that didn't change the fact that they were terrified when the missiles were procured.

The change from being naked to a ballistic missile defense posture raises some of the same automatic anxieties. People are gravely concerned about this "escalation in the arms race." And the old picture does change if defense comes in. But from many points of view, including that of arms control, I would argue that ballistic missile defense makes sense. It helps more than it hurts.

If you read the public debate, you would get absolutely no inkling that this statement might be valid. I am submitting an article to the New York Times which I hope will open up some of these issues. But I cannot blame people, who have only been exposed to public debate, having a one-sided view of the issue.

This has nothing to do with any kind of censorship. It is simply that most people who discuss these issues come from academia. Academia has a sociology. It is pacifistic, cosmopolitan, anti "military-industrial"

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complex, and today almost paranoically suspicious of the U.S. Government.

I would guess that about 90 to 95 percent of the people who are more or less full-time planners and analysts in the defense business tend to favor procurement of at least a thin ballistic missile defense. Yet about the same percent of the people who are "part-time consultants" tend to be against deploying ABM in any form.

There are two obvious answers: The most obvious is, "The first group has been bought and the second group is independent." An almost equally obvious conjecture is, "The first group is serious and the second group is amateurish." I believe neither conjecture is very valid. The first group is interested in defense and tends to stress the virtues of such concepts—though much less singlemindedly than the second group opposes them. The second group comes from academia and thus has a very definite ideology and point of view. Both groups tend to reflect their biases.

If you turn to page 6, you find the second great concern that people have. In chart 5 on page 6, I try to give a sense of what the last decade or two might look like. This chart is intended to frighten people who are not interested in arms control. If they don't get frightened, we make the chart longer.

I have yet to meet a person who does not collapse eventually. So there is a sense in which every serious individual is concerned about this technology and where it is going. We are all concerned.

The issue is not, "are we concerned?", but what is the best way to deal with it? The simple rejection of something new may not be the right answer.

Let me turn now, if I may, to page 10 of the first appendix, right past the blue sheet. You will find a typical summary of a typical debate on defense.

Those who are anti ABM tend to argue (a) the deployment is totally ineffective; or (b) it is too effective. That is, it accelerates arms races or gives the Government such excessive confidence that it will take unnecessary risks.

One also finds the position (c), that it is both ineffective and too effective; that is, positions (a) and (b) above together. Or you find position (d) it is neither too effective nor too ineffective. Positions (e) and (f) give a slightly more sophisticated version of positions (c) and (d). Thus deployment might not be effective enough to protect people, but it might furnish enough of a facade to stimulate the arms race and to lead to risk taking. This is the standard position against ABM.

I argue that a more likely or accurate assessment is (f), that it is effective enough to warrant the various costs, but not so much so as to stimulate the arms race inordinately.

Point (g) is complicated and probably the most accurate description of all.

What I have done in this appendix, to turn to page 1, is try to list what I judge to be the 10 major arguments in favor of the deployment of a thin ballistic missile defense. I listed only serious arguments, nothing I judge to be specious, nothing that I believe is easily answered or demolished. I listed them in order of decreasing importance in my personal judgment.

These arguments to me are so persuasive that, to be provocative, I sometimes tell audiences that I consider the deployment of the thin defense to be noncontroversial. People look at me a little bit curiously and say, "What do you mean by that?"

I then submit an operational definition: If we spend the next hour discussing this issue, something over three-quarters of this audience will change their minds—and will not change it back easily when they argue with someone else—and the remaining 25 percent will be shaken. There are very few public controversies about which one could make this kind of remark, and I believe this is one of them.

Let me now discuss a few of these "pros." I will go through the pros first, because I am more interested in them.

First of all, it is important to be in the business. Why? There are two cases, where one side is in the business and the other is not. If either side is in the business, they learn about these systems. There is a kind of intensity of research, development, thinking, planning, procurement, operations, picking up the details, which is just not there if you are researching a thing just to be in the business of research. It is very hard to keep people motivated.

But if the other side is in the business then we must also understand this problem. In the past we have found weapons effects and failure mechanisms which would give the defense something like 100 percent effectiveness; then we learn how to negate those effects. This has happened a number of times.

I want to put it very strongly; as we studied these systems we found certain effects that could destroy an incoming missile. We did not know about these effects before. We have calculated that against the missiles we actually had, the effect worked nearly 100 percent. If you didn't notice the problem and react appropriately, the other side would have a great advantage, perhaps even a 100 percent defense.

We then calculated how to circumvent the effect, and then the system is worthless again. But if you have anything that is that unstable, you better be in that business, because if the other side works out the effect and has the system deployed to take advantage of it, but you did not notice it or learn about it early enough, you are dead.

There may still be many destruct mechanisms we haven't thought about. In some cases, even if the defense doesn't know about it, the bomb will know, and the incoming missile is still dead. In other cases it takes new tactics or retrofits, or other modifications to exploit the new effect.

That is the basic situation. If you have a missile coming in and you explode something in the general area of that missile, there may exist effects that we do not know about. This has been true in the past; it has been true for every year of our defense business in some system or other; it is going to be true of the future.

Nobody can prove that he can penetrate a ballistic missile defense system. You cannot prove any estimate. When people say that they can, what they are really saying is "The missile will survive all the effects I have checked into, but I do not have enough experience or knowledge to have confidence either that I know all of the effects or that I have even done the calculations correctly."

What about the effects you didn't think about? Well, I can't check those, you see. For most defenses, it usually goes the other way. When

I happen to say, as I have said in the past, that I believe the country can survive a nuclear war, what I am saying is it will survive all the effects I have looked at.

But I should always add "assuming the unlooked at, unrecognized effects are not important." ABM is the first time one can reverse that argument and use it against the opponent. That is a very important point.

A second reason for deploying a thin defense system is that we may eventually wish to get into the serious business of defense. A country like the United States, if it got really scared, probably could put in something close to an effective antidefense against any other country in the world. It would cost some hundreds of billions a year to do this. Nobody is proposing it.

But we have done this kind of thing in the past. You will remember Roosevelt's 25,000 airplanes which people thought ridiculous and turned out to be easy.

In 1950, Congress was debating whether the defense budget should be $14, $15, or $16 billion. The previous year it had been $13 billion. There was the testimony that the country would risk bankruptcy. Then North Korea marched into South Korea and Congress authorized $60 billion. That authorization changed the technology of warfare. It made B–52's entirely feasible. It made SAGE technology feasible. Minuteman, and Polaris technology feasible, and so on. None of them could have been fitted into a $10 to $20 billion a year budget.

There are all sorts of weapons systems today which would suddenly be feasible if we put, say, half of the GNP in defense. When would you put half of the GNP in defense? When you have a phony war. You go into war as the British and French did in World War II. They wouldn't attack the Germans because they were afraid of German counterattack so they mobilized their defenses instead. That could happen again.

There is only one way to deal with a "Hitler." He says to you, "My way or no way," and he means it. He says, "One of us has to be responsible and it will not be me." He says, "One of us is crazy, and between the two of us it is very important to give way to a crazy man, and I am the one who is crazy, not you."

It is very difficult to deal with this kind of an individual, because he may not be bluffing. Much of the time Hitler was not bluffing. He meant what he said. So, what do you do? Bluff back? He is not bluffing.

If you can't bluff, then you may wish to be in a position where you can literally fight a nuclear war. I discuss in the report what is involved in such a mobilization. One wouldn't want to take 10 years to get into that position. It would just be too long. Two years would be much better, and that is about what you could do if you spend money. Three years if you don't, but have the knowledge, experience, and basis on which to build.

What is the third reason? The third reason is an interesting one. The system may work against many Soviet attacks. Why? I put this down as a low-confidence measure because I wish to look respectable, but I think it is more like medium-confidence.

The way we do the defense planning of this country is so peculiar that this possibility gets overlooked. I have seen the following scenario

any number of times. We discover on Monday an effect which is annihilating. On Tuesday we talk about 100 percent defense. On Wednesday we find out how to negate it—at least in theory. On Thursday, we assume the Russians have already negated it or are underway to doing so.

We have in our country large bureaucracies. They tend to be rather rigid, and very hard to influence. I can go down, say, to the Strategic Air Command and quote them a study that shows that they get peak performance in penetrating Soviet defenses by carrying 10,000 pounds of countermeasures in every other plane. They agree with me. What do they do? Double their countermeasures from 50 pounds to 100.

A practical man almost never does more than a factor of two in his life on the basis of a purely theoretical argument. A 100 percent increase is big. Almost no one is going to do a 10,000 percent increase on the basis of an argument. I can demonstrate this effect in history over and over again. For instance, the top Russian generals tend to have an average age of 61. Ours tend to be 56. I have talked to Russians and given them an example much like this and said, "You will not change your system," and they laughed because they know this as well as I do. Indeed most systems do not change easily. All have their rigidities and biases.

Don't misunderstand me, the Russians have the technology and the knowledge to negate our system. The proposed system seems to be relatively easy to negate by a technologically advanced power. But any man who believes that just because the technology is available and the art is available that a system will always react promptly and properly has simply not observed systems. We are rigid. The Russians are transcendentally rigid. They have rigidities we never dreamed of; they invented some of them.

Number 4 is a crucial issue. If there is a widespread expectation in the world that countries will be naked of missile defense then any country with a Polaris submarine is a great power. It could take out 16 cities. Many countries would aspire to great power status. In fact, you can buy a missile for a couple hundred thousand dollars, and 10 for $450 million.

Any country with, roughly speaking, $50 million—and proper manpower—could get into some kind of strategic business. You simply don't want to make strategic warfare cheap. You don't want to make great power status available to any country with $50 million to spend.

Rather, you wish to say, "You are not a great power unless you have a modestly effective ballistic missile defense system and only two countries can do this." This keeps you ahead of the others. It takes the heart out of the arms race, rather than accelerates it.

If you will turn to page 4, I have an argument that cuts two ways. Almost any defense system introduces significant uncertainties. You may be able to penetrate the opponents system or explain that you can do it with high confidence and yet the decisionmakers cannot—or, more likely, will not take the time to—follow the argument. (It will take at least 3 or 4 hours—perhaps 3 or 4 days—to make the argument persuasive.)

It may be difficult to get 3 or 4 hours—much less 3 or 4 days—with Brezhnev or Kosygin. (But it is easier to get 5 hours with Brezhnev

than with the President of the United States. Their decisionmakers are not so busy as ours.)

These uncertainties are really there. I have already pointed out that there is no way to prove one can penetrate. This uncertainty is also one that can make an entire race. If you always do an "offense conservative" calculation, and he is "defense conservative," and both systems are overdesigned, one can spiral upward. In actual practice, this does not seem to happen. It could happen, but for a number of reasons it has not.

First of all, people normally do not do offensive conservative calculations—except on special aspects such as the MIRV calculation and procurement. For one thing, they tend to feel, probably correctly, that for most deterrent purposes any chance that the retaliatory system will work is sufficient to deter. (In other words, they don't say that he must have no doubts at all that he will suffer unacceptable damage, but only, "if he has any doubts at all that he cannot survive, he is much more likely than not to avoid the risks.)"

Even if he decides to go to war, he then must design a system and use tactics that hedge against disaster. He cannot use the cheap and easy way to get through, because if that doesn't work it fails completely, if he has to work overtime.

I have already mentioned No. 6, but it is a separate issue. If you find out a new effect, a new tactic, a new piece of equipment, that will change the performance of the system, if you have a system which can accept this new tactic, new effect, or new piece of equipment, you are in business.

If the other side does not have the system, he is out of business.

I repeat, these kinds of things have come up every single year I have been in this business, and I have been in this business 20 years. I assume it will happen again in the future.

No. 7 is important. Everybody knows that we live by a thread. There are alert missiles in the Soviet Union pointed at Washington today. I assume that they are careful people, that they don't make many mistakes. We have missiles pointed at Moscow. We are careful people. We don't make many mistakes. One or the other of us may some day make a mistake, and both systems will have performed magnificently, if they stop that single missile.

There are two issues here. One, if you have early warning, if you know when it takes off, you have about 25 minutes to decide whether to press the trigger or not, or the other guy calls you. If he has launched a missile accidentally, there is a good chance that he will call, and he can do that fast.

So, you may not have to have standby orders. I would prefer a system with standby orders. This has another difficulty. It is reasonably safe to explode a multimegaton weapon 400 miles up in the atmosphere. It is true that if one looks at it, he will risk retinal burns, and if he continues to look at it, he will risk blindness. All I can say is don't look at it. You don't look at the sun, so don't look at the thermonuclear explosions. If you look at the sun, you will get retinal burns, and the same thing is true of missiles.

Such an explosion also creates some worldwide fallout, such as the old testing system did. Finally, it also violates the test ban. It is a big

thing to explode a nuclear weapon in peacetime. I would think that the proper procedure for a single incoming missile is to assign three missiles to the interception. One missile tries to get a conventional kill. If there are no countermeasures accompanying the single missile, it may be relatively easy to get very close. If that fails, the second missile tries to kill with a low kiloton weapon. If that fails, the third missile tries with a megaton weapon. This could be a standing order. This is a reasonable thing to do.

I would repeat that No. 7 alone is sufficient reason for deploying the systems, even though it is No. 7 in priorities.

No. 8 is also important.

Well, I have run overtime here.

Let me just finish with a comment that obviously there are many arguments against ballistic missile defense systems. A great many of them make sense. An even greater number are specious.

In the long run, I suspect a safer arms control world is one in which there is a heavy emphasis on defense and deemphasis on offense. This is safe in all kinds of ways, even though it contradicts directly the usual picture of a desirable balance of naked nuclear offense forces. This idea of defense emphasis was introduced about 3 or 4 years ago and we at Hudson have done a fair amount of work on it. But I don't want to take up the time of the committee on that idea.

I do want, for the sake of the record, to point out that from the arms control point of view, defense emphasis can be argued to be more stable, more desirable, safer, easier to control, looking at the long run, than offense emphasis, which is the usual position.

Thank you very much for listening so courteously.

(The biography of Mr. Kahn follows:)

HERMAN KAHN

Herman Kahn has been Director since 1961 of the Hudson Institute at Harmon-on-Hudson, N.Y. This "think tank," founded by Mr. Kahn and his associates, has made studies and projections on such diverse topics as the nature of nuclear war and the prospective problems of increasd leisure time. Mr. Kahn, who has specialized in physics and mathematics, is probably best known as a defense analyst, although his wide-ranging knowledge undoubtedly qualifies him also as a "generalist." From 1948 until 1961 he was Senior Physicist and Military Analyst with the Rand Corporation.

Mr. Kahn was born in Bayonne, N.J. in 1922. Following service in the Army of the United States from 1943 through 1945, he received the degree of B.A. at the University of California at Los Angeles in 1945. In 1948 he was awarded the degree of M.S. at the California Institute of Technology.

Among early positions held by Mr. Kahn was that of Mathematician at Northrup Aviation in 1947. In the year 1959, during his service with the Rand Corporation, he undertook research at the Center of International Studies at Princeton University.

Mr. Kahn has served as a consultant to numerous public and private groups, including the Oak Ridge National Laboratory, the Gaither Committee, the U.S. Air Force Scientific Advisory Board, the Atomic Energy Commission, the Office of Economic Planning, the Office of the Secretary of Defense and the Department of State.

Along with numerous scientific and popular articles, Mr. Kahn is the author of books entitled *On Thermonuclear War*, published in 1960; and *Thinking about the Unthinkable*, published in 1962. He is a joint author of *On Escalation: Metaphors and Scenarios*, published in 1965; *The Year 2000*, published in 1967; and *Can We Win in Vietnam?*, published in 1968. He has made more than a dozen trips to Vietnam to study the military and political situation there.

(The prepared statement of Mr. Kahn follows:)

Some Current Nuclear War Issues

(By Herman Kahn)

(Note.—This paper represents the views of its author. No opinions, statements of fact, or conclusions contained in this document can properly be attributed to the Institute, its staff, its Members, or its contracting agencies.)

1. HISTORICAL AND FUTUROLOGICAL PERSPECTIVES

In order to obtain appropriate perspectives on the implications and complexities of almost any current nuclear war issue such as the current controversy over the deployment or nondeployment of a ballistic missile defense (BMD) system, it is useful to have in mind the dynamics of technological change. We want to be able to cope with the future environment both intellectually and in the development of appropriate "hardware."

The charts on the following page argue that every five years since World War II we have experienced a revolution in military technology comparable in magnitude to the developments that took place, say, between the Civil War and the First World War or between the First and the Second World Wars. Typically, doctrinal adjustments have lagged one or two "revolutions" behind the technological developments. There is a serious danger that we today may evaluate and assess such issues as the deployment of BMD in terms of concepts and categories primarily relevant to a phase in military technology belonging to the past. Perhaps there will always be such a lag in our intellectual ability to cope with rapid environmental change—and here I am thinking not only of technological change but social and political changes as well. But to recognize this surely provides no excuse for complacently accepting "conventional wisdoms."

Recently (post World War II) there has been a revolutionary change in the art of central war every five years or so

1. 1951 Technology

B–50 and B–36 form backbone of U.S. SAC
Experimental aerial refueling
Initial production of B–47
First flight of XB–52
Manual air defense system started
Air defense has F–80, F–94, F–86, F–84
Production order for Nike–A
Nuclear-powered airplane under development
Third or fourth generation atomic bombs
Russians have: TU–4, IL–28, YAK–17, MIG–9, MIG–15, and have tested three nuclear weapons
Air research and development command, Lincoln Laboratory, Rand Corporation, etc., established

2. 1956 Technology

Last B–47E produced
B–52 and KC–135 phased in
B–56, SNARK, and XP6M–1 (Martin Seamaster) fly
REGULUS 1 in service
ATLAS, TITAN, and THOR in crash programs
Century series of fighters phased in
Missile master and sage in production
Nuclear-powered plane still under development
Nuclear rocket under development
Nuclear-powered submarine launched
Inexpensive, flexible atomic bombs
Third-generation thrmonuclear bombs
Russians have: Badgers, Bears, Bisons, MRBM'S (SS–3), H-Bombs, MIG–17, MIG–19, YAK–25, SA–1 (GUILD)

3. 1961 Technology

Arms control (techniques and policies)
Controlled response (techniques and policies)
Satellites (VANGUARD, PIONEER, DISCOVERER, TIROS, TRANSIT NOTUS, MERCURY, etc.)
Soft Atlas and soft IRBM's deployed
25–PSI ATLAS, 100–PSI TITAN, BMEW'S, and Polaris phased in
Crash program on MINUTEMAN
Guidance (inertial) breakthrough
B–47E, B–52G and H, B–58 form bulk of SAC
Bombers operated alert and dispersed
Sage and Missile-master partially deployed
BOMARC A and HAWK being phased in
Nike-Hercules, F–100, 101, 102, 104 in service
Cheap civil defense
Inexpensive, efficient & versatile nuclear weapons
There are four nuclear countries
GOOSE, NAVAHO, REGULUS II, F–108, etc., cancelled
Russians have: BLINDERS, ASM'S ("KENNEL," "KIPPER," "KITCHEN," "KANGAROO"), ICBM (SS–6), IRBM (SS–4), MIG–21, SU 9, SA–2 (GUIDELINE)

4. 1965 Technology

Independent nuclear deterrents practical
"Limits" of bomb technology
MINUTEMAN III and POLARIS A_3
Sophisticated satellite program
BMEWS–B, MIDAS–B, SAGE–B, BOMARC B and C, NIKE-ZEUS A and B, HAWK B, F–108, B–58B, B–70, nuclear-powered airplane or rocket, and dynosoar all technologically possible but cancelled
Bulk of megatons on "improved" B–52, B–47, and B–58
Protected command and control
Inexpensive, reliable research missile
Super guidance
Astronautics
Russians have: SLBM (SARK, SERB), ICBM'S (SS–7, SS–8, SS–9, SS–11), IRBM'S (SS–5, "SCAMP", "SCROOGE" (MOBILE), YAK–28, MIG–23, STOL + VTOL TECHNOLOGY, SA–3 (GOA), MOBILE SAM (GANEF, GAINFUL), GRIFFON, GALOSH (ABM)

5. 1970 Technology

Precursor pressures (and preparations) for nuclear weapons for "neutrals" and losers of World War II
FB–111, SCRAM, SCAD
Sophisticated measure/counter-measure BMD penetration systems
Low CEP warheads
MIRV (Multiple Independent Re-entry Vehicles)
Poseidon
Sentinel and other BMD systems
Superhard silos
Airborne doppler shift radars and other sophisticated air defense systems
Multiple applications of lasers under serious development
C–5 type logistic airplanes
Various military uses of satellites (including development of LASP (Low-Altitude Space Platforms) and HASP (High-Altitude Space Platforms))
Decisions on AMSA, ICM, ULM?
Also new techniques in counterinsurgency warfare, e.g., barrier technology, sophisticated gun ships, computerized population control, night vision and other detectors, etc., and most important of all a better understanding of the "Classic" principles of patrols, ambushes, night operations, pursuit, police operations, intelligence, use of indigenous forces, etc., so that modern technology is used to aid these operations rather than to fight and supplant them.
Perhaps also new techniques in insurgency
Russians have: FOBS, MRV's, third-generation SLBM ("Sawfly"), solid-fuel ICBM, mobile ICBM(?), some ABM, helicopter carriers, and naval infantry

6. Some early fifties issues

1. Aerial refueling vs. overseas bases for bombers
2. Active and passive defense systems
3. Deterrence by nuclear strategic bombing vs. by "Detroit"
4. Role of mobilization bases (pre- and post-attack)
5. Presidential command and control over nuclear weapons
6. Role of NATO, WEU, U.N. peacekeeping, etc.
7. Role and value of such "methodologies" as game theory, linear programming, cost/effectiveness, operations research, systems analysis, etc.

7. Some mid-fifties issues

1. Typical attitudes toward nuclear war
2. What is a thermonuclear war?
3. How might it start?
4. With what tactics?
5. How might it end?
6. What were the objectives?
7. What is deterrence?
8. What is a good deterrent?
9. How do you go about analyzing a deterrent system?
10. What are typical results?
11. What are the long-run implications?
12. What are the current choices for the U.S.?
13. For others?
14. How do these affect long-run prospects?

8. Early and mid-sixties issues and formulations

1. Distinctions between various kinds of deterrence
2. Deterrence vs defense and/or offense
3. Controlled response and city-avoidance strategies
4. Multilateral nuclear forces
5. Atmospheric testing
6. Damage limitation vs assured destruction
7. Cost effectiveness, systems analysis, and "whiz kids" move from think tanks to Pentagon
8. Program planning budgeting
9. Other increased "civilian interference" (in research, development, procurement, operations, doctrine and war plans)
10. Chinese nuclear weapons
11. Inexpensive civil defense

9. Mid-/late sixties issues

1. BMD vs assured destruction
2. NPT vs alliance sensitivities
3. Other U.S.-S.U. discussions on arms control
4. Civilian interference in the operation of a war
5. BMD for SAC vs BMD for cities
6. Thin cover BMD vs thick
7. Escalation in SVN
8. B–52's in a local war
9. Chinese strategic systems
10. Superiority vs sufficiency vs parity
11. AMPSA vs F–111 vs B–52

10. Early seventies issues

1. More serious consideration of many of the early issues and especially serious consideration of the possibility of practical non-utopian long-term control of the arms race.
2. At the same time there seems likely to be a less rational and more emotional level of debate and discussion.
3. Focus on reducing co-locations of bases and cities.

4. Superiority versus parity versus "sufficiency."
5. Greater reliance on fear of "rocking the boat" and less on explicit capabilities.
6. General de-emphasis on credible and "not incredible" first strike capabilities versus greater emphasis on general fear of escalation and graduated responses.
7. Lesser dependence on foreign bases.
8. Re-emphasis on nuclear sharing issues, including command and control and planning.
9. New emphasis on nuclear guarantees and nuclear free zones for neutrals.

In discussing how much strategic theory has changed since World War II it is customary to stress the important role played by new technologies such as nuclear weapons, long-range aircraft, missiles, and Polaris submarines. Almost equally important is the fact that these new technologies themselves change very rapidly. And it is not only the spectacular changes which make a difference. For example, the change from high explosives to kiloton nuclear weapons, while more spectacular, was probably not as big as the change from kilotons to megatons. In the first case, one still talked about point targets and what was destroyed; in the second case one tends to talk about area targets and what survives. In the first case one can still think in terms of World War II; in the second case, with multi-megaton weapons, one thinks in terms of forces of nature, of country-wide or world-wide effects; one thinks of attacks on the environment itself. To take another example, some years ago, as indicated in Chart 3, intercontinental missiles achieved a degree of accuracy which was a factor of five or so better than many had expected. This meant that against hard "point targets" missiles were at least 25 times more effective than anticipated. A thousand of the new missiles would do about the same job against hardened targets as twenty-five thousand of the old missiles. Yet very few people discussed, or even noted, the magnitude of this change and its possible consequences.

Consider another example. As indicated in Chart 5, it has been reported by the American press that the U.S. will put three MIRV's (multiple independently-guided reentry vehicles) in its perhaps 1,000 Minuteman III's, and 10 MIRV's in each Poseidon. From possessing somewhat more than fifteen hundred or so targetable warheads available for immediate launching, the U.S. would have about five times as many alert nuclear weapons, or about seventy-five hundred. If this is so, and the MIRV is reasonably accurate and flexible, it might easily provide the U.S. with an annihilating "first-strike capability" against even one or two thouand Soviet ground-based missiles. Thus even though the Soviets have, in recent years, doubled or trebled the number of deployed missiles, the introduction of MIRV greatly increases their vulnerability to U.S. attack. The opposite could also be true if the Soviets can put a technically advanced MIRV of their own in their admittedly much larger (in payload capacity) missiles. In general, after seeing the first five charts on the next page, one can make the flat assertion that any nation with the technology given by any one of these charts could be relatively easily beaten or destroyed in a thermonuclear war by a nation with the technology of a later chart, or could itself beat or destroy a nation with a technology of an earlier chart. There is no automatic nuclear balance of terror—it depends on keeping up. (Thus, even today the Nike-Zeus system we have installed at Kwajalein Island could be deployed in sufficient quantity as to easily stop an attack by any currently deployed missile system. If, of course, we should deploy the Nike-Zeus system we would probably find it negated by even simple countermeasures—so simple that the Chinese, for example, might be capable of having them by 1975—as opposed to the Sentinel or Safeguard systems which probably present the Chinese with an important penetration problem. However, we discuss this later in Appendix I on pros and cons of BMD.)

As indicated by Charts 1, 2, 3, 4, and 5, this improvement in missile accuracy and effectiveness is only one example of many, many changes that have occurred and are still occurring. Charts 6, 7, 8, 9 and 10 illustrate both doctrinal lags and how issues change with technology. I am not suggesting, of course, that the issues are structured entirely or even primarily by the available technology. In fact, I would argue that a host of tactical possibilities, conceptual limitations and creativity, and bureaucratic and human constraints and limitations, all buried in and influenced by current socio-political trends are decisive here; but this is not the time or place to go into this in any detail. What I wish to illustrate is that there is nothing sacred or immortal about the strategic concepts which

structure the current debate on national security issues. Hence, I would argue that we should be willing also to look beyond some of the current concepts and assumptions—particularly in regard to the current BMD discussion. We will do this in the next and later sections of this report.

The first chart on the second chart page gives one scenario for nuclear proliferation in the future. It tries to make the point that it will be most difficult to preserve in perpetuity that result of World War II which made for a power hierarchy in which the five members of the winning coalition (Mainland China is included here) have nuclear weapon privileges while the losers of the conflict and everyone else remain "underprivileged." By 1975 the war will have been over for 30 years and the basis for the acceptance of the results of that war will presumably have been almost completely eroded.

The next chart indicates one difficulty which both the new and older nuclear countries will have in obtaining new systems. I am referring to both the short and long lead times involved. This, however, is not true for what I call improvised on-the-shelf systems which consist mainly of putting together subsystems and components which have already been developed. While such marriages are very difficult, they can often be brought about very rapidly.

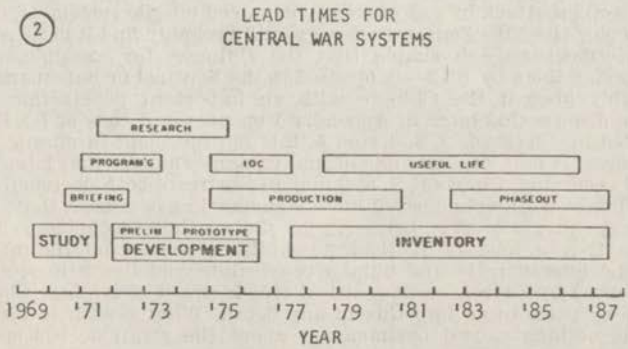
Charts 4 and 5 indicate some of the likely technological developments in the art and capacity of warfare in the rest of this century. We should note with reference to Chart 2 that the current decisions on BMD will affect our defensive capabilities *and* options for a great many years. They also have a significant impact on the kinds of choices that are made among the technological options of the future, particularly as these choices are likely to be influenced as much by the prevailing attitudes, outlooks, concepts and analytical categories as by what is possible in strictly technical terms.

We should also have in mind the long-term systemic alterations which may take place in the international system; both in terms of where we would like to see developments take us and what particular "solutions" we want very much to avoid. Chart 6 lists some possibilities. It is important to assess the implications of our BMD decisions along these macropolitical dimensions as well. With all this forming a broad context for our considerations, let us now turn to relatively specific strategic issues.

Future increasing capability for both change and mass destruction

1. One scenario for nuclear proliferation

1945–"1955": Five victors of World War II either initiated programs or achieved a blast
"1955"–1970: "Gestation" for proliferation to nonvictors
1970–1979: Japan in the early seventies, West Germany about 4 or 5 years later soon followed by Italy. Other possibilities are Sweden and Switzerland or Australia and India
1980–1989: Argentina-Brazil-Mexico, Egypt-Israel, and/or Pakistan seems likely, Yugoslavia, Rumania, S. Korea, and Taiwan are good possibilities
1990–1999: "Everybody"



(3) MODEL T AND MODEL A STRATEGIC ERAS

T	LATE 40's:	EARLY KT; B-50's, & B-36's; LITTLE "THEORY"
	EARLY 50's:	MATURE KT; B-47's; MANUAL AIR DEFENSE; NIKE AJAX; "SIMPLE" THEORY
	LATE 50's:	MATURE TN;* B-52's; SAGE, CENTURY FIGHTERS; NIKE HERCULES; B-36 PHASED OUT; U-2; TURKISH RADAR; APOCALYPTIC VIEWS, FIRST & SECOND-STRIKE ISSUES, RELIABLE GO-AHEAD ORDER
A	EARLY 60's:	ALERT FORCES; ADVANCED TN; "INVULNERABLE" MINUTEMAN & POLARIS; MANY R&D CANCELLATIONS; CONTROLLED RESPONSE; EARLY ARMS CONTROL; CIVIL DEFENSE, "ACCEPTANCE OF PROCUREMENT POLICIES & MILITARY DOCTRINES APPROPRIATE TO A DETENTE"
	LATE 60's:	FURTHER IMPROVED TN; SOPHISTICATED MISSILES; MORE ARMS CONTROL; MORE CANCELLATIONS; LITTLE PERCEIVED THREAT; SOME ATTENTION TO "REALISTIC" SCENARIOS & MOBILIZATION BASES

*THERMONUCLEAR DEVICES

4. The next decade or two

Early 70's: Super sophisticated TN weapons & missiles; "early" ballistic missile defense; effective short-range arms control, but India, Japan, West Germany, Israel & others will have peacetime & military programs that make much simpler the acquisition of nuclear weapons & even advanced delivery systems; preparatory moves to acquire nuclear weapons

Late 70's: new aerospace offense & defense systems (perhaps using lasers or nuclear powered vehicles), late 1950 & early 1960 technology widely diffused, many Nth countries and/or extensive arms control that is more effective than such things as the current nuclear proliferation treaty and test bans

Early or mid-80's (at least potentially): France, Germany, Japan, and the like will have the potential for *at least* a post-model A technology

China, Brazil, Mexico, East Germany, Italy, & so on, will have the potential for at least a model A technology

Potential for improved model T technology generally available (in perhaps fifty countries)

U.S. & S.U. could have massive space capabilities—both defensive & offensive—effective aerospace defense (at least against model T & A threats)—extraordinarily flexible, reliable & enormously capable real time command, control, communication, and surveillance systems—elaborate and flexible world-wide logistic capabilities—etc.

5. In the last decade or two of the 20th century

1. As a result of ordinary improvement and development, simple nuclear-armed, long-range vehicles which are very inexpensive and available to even very small powers. Any of the largest powers and many smaller ones should be able to obtain and maintain, say, 500 missiles with, say, current "Minute-man capability" or better for one or two billion dollars procurement cost or less and a few hundred million dollars annual upkeep (1965 dollars)
2. More or less widely available technology:
   - New kinds of nuclear weapons
   - Various kinds of laser or other "death rays"
   - A menu of techniques for effective chemical and/or biological warfare in various applications
   - New kinds of ballistic missile defense particularly effective against relatively small offense forces or against forces which use unsophisticated technology and/or tactics

Similar developments for air defense against airborne threats
Well-understood doomsday machines (or near-doomsday machines)
Tsunami (tidal wave) producers
Climate changers, earth scorchers, or other ways to modify or damage the environment on a large scale
New forms of psychological, or even direct mental warfare
The invention of a "nuclear six-gun" technology—or at least the development of inexpensive and widely available versions of the nuclear weapons and other weapons of mass destruction characteristics of the military technologies of the mid- and late Twentieth century.

3. Depending on the defenses of the large powers and the super-powers (and other "technical and tactical details"), these weapons systems may prove to be "equalizers" in the Gallois or "American west" sense, or they may allow for a definite hierarchy of powers. Some of these systems, and certainly much of the technology behind them, might also be relatively available to private individuals or at least private organizations and extremist political factions.
4. The development of very effective techniques for counterinsurgency warfare—and perhaps for insurgency and/or terroristic activities as well. The latter could allow even relatively small groups, if not effectively opposed, to disrupt, easily and effectively, almost any society. Yet much of the new technology—with the possible reinforcement of onerous social controls—might also make such insurgency or terrorism difficult or limit its effectiveness.

How Will Escalation Be Handled in the Twenty-First Century?

1. Minor modification of current system
2. All-out war system withered away
   A. Rule of law
   B. Pluralistic security community
   C. Rule of *fait accompli* (internal war)
   D. Instrumental wars (rational self-interest restraints)
   E. Agonistic wars (limited by absolute rules)
   F. Potlatch wars (space, foreign aid, "showy" systems, etc.)
   G. Other substitute for central war
3. Elimination or control of weapons of mass destruction by:
   A. Agreement or revulsion
   B. Large setback to civilization
4. Other basic change in system
   A. Bloc systems (with restraints and rituals)
   B. Community sanctions
   C. Condominiums (U.S.-S.U.?, collective security?, U.N.?)
   D. Concert of (large or small) powers
   E. "World government"
   F. World empire (or empires)
   G. Disarmed, but "uncontrolled" nations

2. SOME CONTEXTUAL PERSPECTIVES ON THE STRATEGIC ISSUES

At the upper levels of nuclear warfare we are not only considering events that are completely unexperienced, but increasingly hard for many to envisage; despite much intellectual progress in some areas, in other areas ideas which were once reasonably clearly and widely understood are disappearing from the discussion or being simplistically and/or ideologically distorted. It is therefore very easy to sympathize with the common attitude that simply rejects the concept of "fighting a war." There really are two forms of this rejection: he first rejects deterrence as well, arguing that it is impossible to live with the threat of nuclear weapons because if the threat exists over a long period of time, eventually the weapons will be used—and the possibility (sometimes the term used is "certainty") of escalation to all-out levels makes deterrence actually a strategy of eventual suicide and homicide. The second form of rejection holds that we must rely completely on deterrence and not even examine seriously, much less prepare for, any of the ways in which deterrence can fail.

It is this last attitude that often in the past filled planning papers with references to "instant retaliation," "instant use of nuclear weapons," "instant this" and "instant that," when it was clear to almost everybody that nobody would jump

exuberantly into any nuclear escalation—much less the large-scale use of such weapons.[1]

The insistence on a term such as "instant" suggests that the writers of these plans were eager to believe that the government would not stop to think. But a government that did not stop to think would be extremely accident-prone, and, moreover, much too trigger-happy in crises that develop slowly. Clearly even relatively reckless decision-makers—when it comes to authorizing nuclear use—will in most circumstances think through both the problems and the consequences of such action. Therefore those planning documents that are liberally endowed with various kinds of "instants," or in which there is a dependence upon "resolve" alone, are unlikely to express realistic contingency plans. They may introduce a useful uncertainty in the enemy's mind, but even this is increasingly unlikely. Almost all they are likely to accomplish in the future is to give a facade to the politician and an excuse to the "planner" to persist in the psychological rejection of nuclear weapons, a rejection that forces the nation to rely entirely on deterrence working, without ever examining realistically how deterrence might be strained and even fail.

The opposite of rejection is, of course, "acceptance." This means, at the minimum conceding not only that the weapons exist, but that they may be used. What does this mean in practice? Paradoxically, it seems increasingly likely to mean a judgment that the best strategy is to go back to one of the rejection strategies. This position can be supported by the argument that whatever the constructive measures which might be taken to alleviate or limit the consequences of the actual use of nuclear weapons, they are likely to be swamped by various mistakes and negative consequences. The most obvious possibility is that it is simply intellectually, administratively, and financially too difficult to keep up with the kind of rapid development described by the five charts on page 4. Therefore some other method must be found to cope with the problem. The one that most "lay analysts" seem to have found most satisfactory is the notion of keeping the two super-powers absolutely naked of defenses but with "invulnerable" offensive forces. The invulnerabiilty is perhaps to be achieved as much by a mutual agreement not to try to obtain counterforce capabilities, and of course the absence of defenses makes even a small surviving force quite lethal. (These calculations are often done quite unrealistically ignoring, for example, the possibility that there might be last minute evacuation or other civil defense preparations that could be quite effective against relatively small residual forces.)

Once one is firmly fixed on this picture of two naked super-powers, each possessing invulnerable forces, one tends to have an almost manic hatred for any effort to alleviate in the slightest any of the possible deleterious consequences of a war. This tends to create an intense ideological bias against trying to consider any kind of defenses, control, and even the dangers of being naked to Nth countries, or the likelihood that such nakedness would tempt another nuclear power to attempt to achieve super-power status by the procurement of a relatively small force.[2]

A different attitude, and one I share, is that one must recognize the possibility of a controlled and limited use of these weapons, and of the desirability of alleviating the consequences, whether or not there is much control or limitation. In principle, at least, doing this can improve deterrence, while at the same time decreasing markedly both the likelihood of a catastrophic mistake and the consequences of a failure of deterrence. This is not to argue that if thermonuclear war occurs it will necessarily be controlled; only that it might be controlled. (However, I would judge it quite likely, in a large range of circumstances, that decisionmakers will attempt, at least initially, to maintain limitations and constraints.)

There seem to be at least two different attitudes towards this idea of "controlled war." Some analysts seem to prefer this concept in a context in which two super-powers are naked, thus avoiding any notion that either power might try to "win" or improve its strategic position by its military operations. Other ana-

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[1] See, for example, my note on pages 185 and 186 of *On Escalation: Metaphors and Scenarios* (Praeger, 1965).

[2] We shall discuss further in Appendix I, on the pros and cons of BMD, some of the unrealistic aspects of this attitude. We can sympathize indeed with the desirability of solving all of the complexities of the arms race and of strategic requirements by this simple, and to many, peaceful picture of a naked balance of terror. However, as indicated in the appendix, it seems to be quite implausible both as a prediction of what is going to happen and as a desirable situation.

lysts, including the author of this paper, tend to believe that both defenses and counterforce capabilities and operations can be important, desirable and even moral, and that while there easily may be controlled reprisal against civilian targets in a nuclear war, the norm (in both a normative and predictive sense) should envisage attempts to improve one's strategic position vis-a-vis one's opponent at the same time trying to limit the loss of civilian lives and property.

There used to be another apparent form of acceptance which was really a disguised form of rejection—a rejection similar to that of those who rely on deterrence alone. This was an excessive and explicit attempt to obtain deterrence of various actions by threatening a massive orgiastic spasm of damage and to try to give credibility by resolve alone or by resolve and rigidity—to announce that one intended to act like an automaton or "force of nature" in following through announced retaliation policies—despite even a possible certainty of equal damage being inflicted by the enemy in his spasm retaliation. It was believed that if one appeared sufficiently committed, one's opponents would not be willing to take any risks, but would simply adapt their actions to avoid the threat represented as a force of nature. Thus, if one of the super-powers made clear it would "inevitably" launch an all-out uncontrolled spasm attack if provoked by certain actions, if the other side believed this threat, it would be unlikely to carry through any of the forbidden acts. A much used metaphor for this kind of policy is playing the game of "chicken"—blind, drunk, and conspicuously out of control. The other player then almost has to give way. Such policies almost inevitably turn out to be declaratory policies—i.e., for good, political, prudential, technological and many other reasons, they are bluffs. They are so obviously "ostensible" that they really amount to a form of psychological rejection of the existence of nuclear weapons and an indulgence in fantasy and illusion. But this hope for political or military gains by the use of stark nuclear threats—particularly as a response to nonnuclear or limited nuclear provocations seems to be diminishing—at least insofar as people hope to exploit such stark threats explicitly.

Almost everyone is convinced, whether he accepts or rejects nuclear weapons, that in the long run the current international system is unacceptable. This belief is in itself a source of serious erosion of morale. It also leads to much illusionary thinking that one might make sufficient reforms in the system in the near future as to fundamentally change its character. Some place their faith in a rapid evolution of the nation-state system to one of world law—usually without addressing seriously the issue of the world legislature.[3] Others hope to hold the nuclear line at the current point more or less indefinitely (which means saying that the five victors of World War II—including Mainland China as a victor—may have nuclear weapons, and the losers and neutrals may not).[4] Still others, noting the important changes mentioned in the early part of this paper, assume that the institution of war has withered away, but that we just have not noticed it and are artificially keeping it alive.

It is because of these tendencies to overemphasize the degree of change, and because of the many difficulties in coming to grips with the subject, that it is also important to note that many things have not changed. Except possibly in Western Europe, the nation-state is still the main engine and means for society to get things done. There is nothing new in escalation-prone conflicts, conflicts in which each side decides for itself the justice of its cause, its prospects, and how far it will pursue its ends. If a war starts, the war will still ultimately end, and, even if there is a large and uncontrolled nuclear war, it is unlikely (as far as we can judge) that there will be an "end of history." (The need to add the phrase "as far as we can judge" does strike a new note.) The recuperation that will "prob-

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[3] The most serious attempt, that by Grenville Clark and Louis Sohn, gives India and China the same representation as the U.S. and the Soviet Union, and three times the representation of Japan, Germany, France, and the United Kingdom.

[4] While many people would be willing to say to the Germans that they cannot change many of the territorial results of World War II without having a war, few would be willing to say. "Until you win a war, you will be politically second class." Yet, many West Germans have interpreted the non-proliferation treaty in exactly this sense. Those treaty negotiations also provoked many in Japan, Italy, and India. One can make a plausible case that if no negotiations had taken place, there still was little or no chance for any proliferation before 1975. Not Germany but India would have been the most likely "next" nuclear power, and an Indian nuclear weapons program in itself would not touch off further proliferation. The only way to judge the non-proliferation treaty will be by its impact ten or more years hence. From this point of view, one can make a point of argument that the treaty, by raising nuclear fears and nuclear expectations, by making states intensely interested in safe-guarding their nuclear interests, actually advanced nuclear preparations in a number of states by an appreciable amount, or at least tended to do so.

ably" occur, after such a war, will probably involve and restore international relations, as well as other aspects of normality. Before a war has occurred international crises will still involve bargaining and the possibility of escalation, and if there is escalation the bargaining may continue during the escalation. Morale, courage, and daring can still make a great deal of difference—before, during, and in the termination of any crisis. Both before and during the use of violence there are still possibilities for "long shots" and surprises. There are still possibilities for nuclear "Cannaes"[5] and nuclear "Pearl Harbors"; and even the possibility of mutual destruction is not really new; only the speed and thoroughness with which it can be done. Finally, there are possibilities for both rational and irrational decision; for rational and irrational actions and motivations, for war by calculation as well as by miscalculation, for limitation, prudence, and plan, as well as rigid and all-out spasm attacks.

To the extent that one takes the possibility of war seriously at all, it is of even greater importance than usual to have sound or brilliant strategies, good or excellent tactics, high performance and reliable programs and equipment—since so much more is being risked. There is also a real possibility for a formal declaration or war—perhaps followed by a lengthy phony war, such as occurred during World War II. In fact, many of the scenarios written at Hudson Institute, in studying these issues, often bring in such possibilities as the kind of "phony war" with which World War II started.

One reason for this is very simple. It is difficult to write a plausible scenario in which a nation goes to nuclear war to seek immediate, positive gains. It is even difficult to imagine initiating a nuclear war in the belief that a state's long-range prospects might be improved. (Even if calculations or analyses indicate this possibility, few analysts think there is any significant probability that an actual government would believe the calculations or, even believing them, would trust them—be willing to rely on them to the extent of risking "all" on a simple throw of the nuclear dice—or even on a complex manipulation of loaded and biased dice.)

On the other hand, one can imagine going to war if there are great external pressures to do so—if disaster seems overwhelmingly imminent if one does not. There could also be pressures to act first, to strike before the other side strikes. This situation—in which there is mutual pressure to strike—has much been studied and has been the nightmare of many arms controllers and strategists; indeed some will argue that it has been excessively studied. It is also important to note that there may be much pressure to go to war, but that this pressure can often be easily nullified by the counterpressure exerted by fear of the possible consequences of a war; i.e., by deterrence.

As a result there is now widespread consensus that the only time the fear of war is overcome is when there is an even greater fear—when the war—if successful—will resolve some desperate crisis, or avert some kind of great disaster. A state compares the stark consequences of not fighting with fighting—or at least of war with no war. In many scenarios a simple declaration of war may suffice for the immediate problem. This was precisely the problem the British and French had in World War II. They thought they could do nothing to stop the invasion of Poland, but they could not allow this invasion to become a *fait accompli*, so they declared war. What was to happen next was not at all clear, but at least the mere passage of time would not ratify German occupation. As discussed later, such a "phony war" can be a most useful option.

Conceivably such a situation could occur today. An implausible, but perhaps instructive scenario might go as follows: assume the Soviets reinforced East Germany and Czechoslovakia with fifty or a hundred divisions, made it very clear that they had more than adequate second-strike capability, and then decided to take Berlin, perhaps killing a third of the Allied garrison in the process. There could then be many different scenarios for a United States or NATO retaliation, but there seems little that could be done physically against a determined Soviet Union—particularly if there are also 800 or so IRBM's pointed at Western Europe.

What the United States could do, however, is declare war and mobilize. A massive mobilization would make a difference. For example, in June 1950, the Congress was debating whether the defense budget should be 14, 15, or 16 billion dollars. North Korea marched into South Korea, and Congress authorized 60

[5] Cannae, an ancient village in Southeast Italy, was the scene in 216 B.C. of Hannibal's crushing defeat of the Romans. By brilliant cavalry tactics Hannibal managed to surround the entire force and cut it to pieces.

billion dollars. The authorization suddenly made feasible such weapon systems as Minuteman Polaris, B–25's, air defense and the like (none of these could be fitted into a 15 billion dollar a year budget). Similarly, the authorizations in this scenario could make "feasible" technological systems which are unfeasible today.

Consider an extreme form of this scenario (discussed further in Appendix II, under the title "The War of Competitive Mobilization"). Assume the U.S. possesses an adequate enough deterrent to prevent a Soviet attack on the United States, even though we provoked them enormously or put real pressure on them to preempt. Under these circumstances, in the above scenario the United States might well declare war. Berlin, after all, is the most sensitive spot on earth. A declaration of war might easily be followed by budgets in the hundreds of billions of dollars a year. With such preparations, it would be possible to build almost a "spare United States" underground in a year or two. Even more important, it would be possible to employ such missile systems as GAMBI or other space defense systems, in which orbiting satellites shoot at missiles while the missiles are in the boost phase, and very vulnerable to attack. It is true that such systems might easily cost a hundred billion or so to deploy, and many tens of millions a year to maintain, but they would be well within the available budgets. One can imagine missile defenses in depth, with systems which shoot at missiles while they are being launched, in the boost phase, in mid course, re-entering the atmosphere, in high atmosphere and in low atmosphere. Such a system might be extremely effective because it puts incompatible or competing requirements on the design of the penetration measures.

A study of this kind of competitive mobilization is important for the future in two ways: (a) it could, just as the Korean mobilization did, change the "rules of the game" by moving the arms competition to a qualitative and quantitative level at which the Soviets cannot compete; and therefore can be used by the U.S. as a special tactic or strategy in which it tries to deter provocation and if deterrence fails changes the rules so that it can either do something or be in a position of great strength anyway; or (b) a competitive mobilization situation may be thought of as a great disaster, almost as dangerous as nuclear war itself. Some of these issues, as well as even more bizarre possibilities, are discussed in Appendix II.

It is of crucial importance for us to understand that many wars are won, not by the introduction of new technologies or sheer mass of weaponry, but by competent and ingenious tactics and by creative and statesmanlike strategies, and that there are many opportunities today for such competence, ingenuity, creativity, and statesmanship. Probably one of the most serious defects in current discussion is the general unwillingness to recognize that these opportunities exist. Of course, in some ways the present situation is an improvement over five or six years ago. I remember early in 1962 I gave a briefing at the Pentagon in which I asserted that the Hudson Institute had the world's four greatest experts on how to *terminate* a nuclear war which had just started. I felt that this was quite a feat since at the time we were less than nine months old. Someone asked me how I had managed to hire these experts, since a new organization usually has great difficulty in hiring people of such capabilities, especially at a time when there was great competition in the United States for strategic experts. I answered that it really was much easier than he realized. I had simply asked four of our junior people to spend two or three days on the subject. Since, so far as I knew, hardly anyone was thinking about the problems of war termination, that made them the world's greatest experts.

There had been almost no study of how to win a war—which is one kind of war termination—except by the most brute-force method, namely reducing the enemy to rubble. Sometimes such a victory is defined as two Americans and one Russian surviving. But this is not usually how victory is defined and wars are won; rather, they are usually won by subjecting the enemy to one's will or some issue or issues; the more clever the strategy and tactics of fighting, the less damage one has to do, and suffer, in order to attain that objective. I am referring here, of course, to combinations of "controlled response," "flexible response," and the use of intra-war deterrence and postattack blackmail, as crucial tools in a nuclear war—much more crucial than naive emphasis on technology, numbers, and simplistic scenarios would indicate. (It is also worth noting that the same mis-emphasis seems to have plagued our Vietnamese policies—and to an almost unbelievable degree. See, for example, *Can We Win in Vietnam?*, New York, Praeger, 1968.)

An understanding of strategy may help not only in offense and defense, but also in arms control. Take, for example, the somewhat bizarre concept of a "nuclear talionic reprisal," or what might be thought of as a nuclear "tit-for-tat." This is the nuclear analogy of the Biblical "eye for an eye."

When one side suffers a nuclear attack or other nuclear provocation it responds more or less in kind, or at least in some manner reasonably proportionate to the other's provocation, using means and tactics appropriate to the situation. If a nuclear talionic reprisal terminates nuclear violence, the process may be considered a kind of nuclear peacekeeping.

The idea that such a technique might be used to punish nuclear "breaches of the peace"—and even be a kind of arms control—strikes many people as bizarre. It obviously has more in common with the rendering of justice in primitive tribes than with the methods of maintaining public order in modern national societies. Yet abstract justice is hardly more available today in the international arena than in the primitive tribe. Official justice, as we normally understand it, is rendered by an impartial authority with no special or personal interest in the decision. It includes provisions to control those who break the public peace, making use of agents of this impartial authority who again normally are without special or personal involvements.

In international relations what can substitute for this impersonal court and its agents? In practice, a partial answer has been found on occasion in techniques typical of primitive (and even semi-advanced) communities which have not evolved the machinery for the impersonal enforcement of law and justice. In such communities a common form of deterring, punishing, and redressing crimes against individuals or the public peace is some form of lex talionis, applying the principle of not only *at least* "an eye for an eye and a tooth for a tooth," but also *at most* an eye for an eye and a tooth for a tooth.[6] In the nineteenth century, this kind of response found some international legal standing in the doctrine that a state was entitled to retaliate for an illegal provocation with a "proportionate reprisal" and that this proportionate reprisal should then terminate the official state of hostilities. Our term, "nuclear talionic reprisal," applied to nuclear retaliations, carries a connotation that the response is intended to be proportionate, violence-limiting, and consistent with an early and mutually acceptable nuclear cease-fire (or at least de-escalation). In some cases, the criteria of due proportion and violence limitation will depend on the states concerned and the context. However, in all cases the nuclear talionic response is intended to produce at least a nuclear cease-fire or other nuclear limitation.

At least conceptually, the use of nuclear talionic reprisal as a basic technique for keeping the nuclear peace has more in common with many U.N. peacekeeping operations than with normal judicial procedures. Thus nuclear talionic reprisal does not result in an investigation of who is right. It is intended—as most U.N. peacekeeping operations are—simply to stop the violence, but with a recognition that it is most unlikely that the violence can be stopped while the provocation or damage is one-sided and the more grievously injured party is capable of nuclear retaliation and willing to carry it out. Presumably the least one could hope for is a rough "evening out" of at least the nuclear damage, and after that at least a "nuclear cease-fire."

There is also the possibility of a nuclear reprisal (or exemplary attack) in response to a non-nuclear provocation. The intention may be that this attack then will end the matter, or there may be a willingness to accept a nuclear talionic or proportionate nuclear response with the expectation that this will then terminate the exchange.

Concepts such as massive mobilization and limited nuclear reprisal are really almost an inevitable result of the current tendency towards assured destruction as the major peacetime objective of a strategic force. This results in strategies in which the major objective of the nation is to have a reliable ability to retaliate, whatever the nature of the attack, with little or no attention paid to ability to survive the war if deterrence fails. Since it is most implausible that a nation actually will respond with an all-out attack to anything less than an all-out at-

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[6] The principle of "an eye for an eye and a tooth for a tooth," as a violence-limiting device is stated in the twenty-first chapter of Exodus, but it is far older than Exodus and can be found in the Code of Hammurabi. It is alive today in some traditional societies, including some southern European societies. For some "practical" suggestions on how these ideas might be incorporated in world-wide arms control arrangements, see my articles in the *Yale Law Journal*, Vol. 76, No. 1, November 1966 and in the *California Law Journal*.

tack, it becomes necessary to invent such bizzare strategies as "competitive mobilization" or limited nuclear reprisal.

One should also add to the arsenal of "useful" nuclear war concepts the idea of a "calculating war" (or "nuclear war as a continuation of politics by other means"). In analyzing calculating wars the major elements are as follows:

- Outbreak Communication, Bargaining, and Tactics
- Protection during the war by using:
  - Intrawar deterrence
  - Communications with the enemy (and therefore self restraint)
  - Counterforce (fast and slow)
  - Active and passive defense
- Bargaining during the war by:
  - Improving threat position
  - Using slow motion and abatement tactics
  - Special attacks and messages
  - Bargaining
- War termination communication, bargaining, and tactics

As can be seen, I would emphasize the possibility that communications and bargaining between enemies will play a central role. This of course goes contrary to much popular thinking on the subject. Such bargaining might involve the following kinds of issues between two enemies, P and Q:

I. P's Current and future threat against Q's:
   1. Society
   2. Strategic forces
      A. Its countervalue capability
      B. Its counterforce capability

II. Q's Current and future threat against P

III. P's Resolve against Q's resolve (the *who, whom, why* issues):
   1. Each side's calculations of potential gain vs. two-sided uncertainty
   2. Expectations about attitudes and morale
   3. Current "emotional" and objective state
   4. Strategy, tactics, and "technical" capabilities

IV. The Promises Each Country Can Make to the Other:
   1. Value of promise
   2. Credibility and deliverability of promise

If one takes such ideas a calculating war and limited nuclear attacks seriously, one notices that there are many other possible pictures of nuclear war than the simple picture of two massive homicidal attacks. One can think of any one of the following seven scenarios as an equally reasonable model of how a war might go.

1. Ultimatum—"nuclear signal"—negotiations
2. Fait accompli—nuclear use—ad hoc cease fire—reasonable but hopeless demands
3. Extended provocation—ultimatums, messages, and emergency civil defense measures—"constrained counterforce" or "counterforce with avoidance"—threats to retaliate against city bombing—negotiations or ultimatums
4. Massive counterforce attacks to enhance likelihood of "unexpected" weapons effects
5. Mixed counterforce-countervalue
6. Pure countervalue to break spirit, bargaining, or other purposes, and perhaps to make more likely a pure talionic (Tit-for Tat) retaliation
7. "Classic" controlled central war

The "Classic" Controlled War could go as follows:

1. Provocations and crises followed by some degree of improvised protection and/or mobilization
2. Harassing escalation and language, specific demands
3. Large but controlled counterforce attack (perhaps preceded or accompanied by a message)
4. A largely counterforce retaliation
5. Continued counterforce war until all appropriate targets or allotted forces are "used up"
6. Some abatement and some negotiation—possibly "aided" by careful countervalue or symbolic attacks
7. While intermediate and slow motion counterforce war goes on
8. Conventional and tactical nuclear war may also be going on
9. Eventual cease fire or escalation in either 7 or 8 above.

Nevertheless we should not forget in examining and analyzing the above possibilities that the most likely result and objectives in a two-sided nuclear war—once bombs have started to drop on both sides, but neither has an extreme advantage—will be a simple cease fire. This overwhelming desire for an immediate cease fire could arise from any one of the following motives:

1. Mutual shock reaction swamping politics
2. Too much civilian damage has been suffered (e.g., "Nation's will" is broken)
3. Fear that the other side will escalate excessively even if doing so is self-destructive, i.e., that the rules will be broken
4. Other costs or risks too great for potential gains
5. Minimum "positive" military or competitive political objectives have been (or can be) achieved without further military operations
6. Requirements of "equitable" retribution have been satisfied
7. Other noblesse oblige or "potlatch" requirements satisfied (requirements of honor, prestige, commitment, etc.)
8. The theory of victory or safety has failed—or at least been made doubtful
9. An "ad hoc cease fire" seems *technically* much more feasible than a "conditional cease fire"
10. One's relative military (or, better, bargaining) position does not seem likely to improve enough to justify costs and risks

All of this is very different in concept from the simple finite deterrence picture. However, I would argue that while pure finite deterrence is unacceptable any one of the following six strategies could be taken seriously as a possibility for the United States today:

1. Mostly Finite Deterrence
2. Partial Damage Limiting
3. Deterrence Plus Insurance
4. Not Incredible Counterforce First Strike
5. Expanded Insurance
6. Arms Control and Defense Emphasis

I would be prepared to defend any one of them as practical, feasible, and fulfilling the national interests of the United States. The choices among the strategies are based mainly upon personal assumptions and values and not on objective considerations. (I might note, with some depression, that the list is ordered in terms of declining political feasibility and, in my judgment, increasing desirability. However, the first four are in the range of practical political discussion.)

The fact that one virtually must choose a strategy by making an overall analysis and not by muddling through but with sweeping decision and over-all plan and concept, is one of the most important changes that has occurred since World War II. If one accepted only incremental peaceful changes or muddling through, one would almost certainly end by choosing one of the first two strategies or some other form of finite deterrence. And, as we suggested earlier, this may be one of the major reasons variations of finite deterrence enjoy such widespread popularity in the West. Very briefly these six strategies can be characterized as follows:

Mostly finite deterrence.—"Adequate" and "credible" two-way threats with "guaranteed" hostages, but no unnecessary damage or automaticity—desired because of feasibility, cost, image, or arms control considerations.

Partial damage limiting.—Concedes war can happen—simple hedges and cheap insurance—but limited budgets, detente, and tranquilizer arms race—at least a facade of extended deterrence capability for credibility of U.S. strategic guarantees and escalation adequacy.

Arms control through defense.—Also defense through arms control—prudential and hedged—limits hostages—maintains great power superiority—slows down arms race.

Deterrence plus insurance.—Emphasizes war can happen—insurance—intend to survive and perhaps to win—no explicit first strike threats, but escalation assurance.

Extended insurance.—Prudential, nonaggressive but deep concern with crises, deterrence failing, extreme provocation, unorthodox opponents and preventive (just) war potential.

Not incredible counterforce first strike.—Strategic guarantees—other extended deterrence—escalation dominance—but prudential and nonaggressive central war policies.

It is probably worthwhile to make a few comments about the Arms Control and Defense Emphasis postures. Its advocates often try to make clear that defense is not necessarily antithetical to arms control. In fact, if one had to choose between a strategic balance in which a number of countries were allowed to have very large defense budgets, possibly as large as they wished, but with severe limits on the offense, or one in which there were large offense budgets but very severe limits on defense, the first might be preferable for a number of reasons. The most important of these are: (1) It is very cheap to get into the offense business if there is no defense; therefore, with some caveats (which may easily be neglected) any nation can become a nuclear power and may be tempted to do so. (2) If deterrence fails and there is war, the amount of damage will be significantly limited. (3) It is much more difficult to indulge in nuclear blackmail if one has a small offense and the opponent has a large defense. (4) There remains probably more than enough deterrence for normal situations, since nobody is actually going to believe the calculations or, as a practical matter, be willing to risk rocking the boat. On the other hand, if the situation is abnormal—for example, if the other side tries "rationality of irrationality" tactics—resistance to these is likely to be much more credible.[7]

No discussion of future strategy would be complete without some comment on the future of guerrilla warfare and its interactions with higher forms of violence. There are many reasons for believing that increasingly, around the world, various disaffected groups may be inclined to use violence to achieve their objectives. These include racial, ethnic, or religious minorities, nativist movements, some kinds of populist movments, student groups, Castro-type guerrillas, various other political groups, and even groups which are more bandits than politicals. One can argue that, at least for a time and to some degree, the seemingly more stable a society, and the more permissive and economically successful it is, the more likely it is to experience anarchic movements of various sorts. But these, of course, are a far cry from the kind of guerrilla warfare being waged now in South Vietnam. It does not seem likely that guerrilla war of this intensity will be very common in the future. One requirement of such a war is a group of people as dedicated, competent, disciplined, and "manic" as the Viet Minh and Viet Cong. Another requirement is suitable geography, such as jungles or mountains. A possible third may be a certain kind of mismanagement by the large, intervening power.

One could, of course, have a much lower level of war. For example, it is very likely that Czechoslovakia will resist the Soviet occupation with "good soldier Schweik" techniques, but this will not prevent the satisfaction of many Soviet objectives, as well as a good deal of ad hoc cooperation with the Soviets. We may or may not wish to think of such passive resistance as a kind of low-level guerrilla war.

One of the real nightmares associated with these "low-level" wars is the possible use of advanced technology by the insurgents. There seem to be extraordinary possibilities here. At least in the United States, technical people characteristically ask questions of the form "What if somebody tries to . . . ?"; "What then?". This, of course, is not the current style of guerrilla warriors, who are ordinarily not technologically trained nor technologically imaginative. Up to now, well-educated and technologically trained people have been far likelier to be members of the establishment than insurgents. But increasingly it seems possible that technical intellectuals may be co-opted into one or more kinds of violent movements. While it is not difficult to imagine the kinds of things that could then happen, I do not think it would be appropriate to furnish any illustrations. However, the reader can refer to Chart 5 on page 6 for some of the possibilities the next two or three decades may bring.

Let us terminate this discussion by considering what is sometimes called the "powerlessness of the powerful," but it is a very special kind of impotence. It is often a self-deterrence which rests on unwillingness to offend public opinion or upset some *modus vivendi* between one and another power. If the nation is willing to accept a great deal of unpopularity this self-deterrence could virtually disappear.

This self-deterrence may have subtle aspects. Consider a situation, for example, in which one of the medium powers has a moderately large force of, say, 100

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[7] There are other reasons the Arms Control and Defense posture could be a good one, but I cannot go into them here. For some discussion of these see an article by D. G. Brennan in *Foreign Affairs*, April 1969.

missiles and 100 bombers, neither of which could be guaranteed to penetrate the superpower's defenses but which the superpower could not guarantee could not penetrate either. Conceivably the superpower might then launch a very large attack and with very high reliability destroy its opponent's 100 missiles and the 100 bombers on the ground. However, that would be a very large attack and it is almost impossible to imagine any plausible crisis which would justify destruction of such magnitude. On the other hand, the superpower might be deterred from a very small attack on the medium power because it could not then feel secure that the medium power could not retaliate and, in General de Gaulle's phrase, "tear off an arm." Thus the superpower could be "self-deterred" from making an annihilating attack, while deterred by fear of retaliation from making a small attack. (But it is important to remember self-deterrence is only *self*-deterrence.)

There is another reason for what might be called the "powerlessness of the powerful" and this operates not only between superpowers and small to medium powers but between, for example, the trustees of universities and their dissident students. There is a very real tendency for the powerful not to think through new problems. The powerful are, by and large, no less intelligent than the powerless, but they know that their power can usually be used to rescue them from the consequences of their mistakes. In general, they simply do not feel under pressure to become ingenious, daring, imaginative, courageous, or innovative. The powerless, if they are not too neurotic as well, are very clear about the fact that they cannot get away on sheer megatonnage or billions of people or billions of dollars. They have to be clever, ingenious, daring, innovative, and use all kinds of jiu jitsu. Under these circumstances the powerful may lose the competition because the other side has in fact circumscribed, avoided, or otherwise nullified their power.

On the other hand, these difficulties of the powerful may be overcome once they have become apparent. For example, it is not the existence of huge stocks of megaton weapons that prevents the United States from winning in South Vietnam; it is poor tactics and strategies. Resources of 35 billion dollars a year and hundreds of thousands of men are being invested. While there is self-deterrence from major escalation, there is no self-deterrence on the level at which the war is being fought—just ineffectiveness stemming perhaps from a kind of overconfidence of the powerful.

This source of ineffectiveness may be lessened or removed in the future. For one thing there are many kinds of new techniques becoming available, such as barrier technology, sophisticated gun ships, computerized population control, and night vision and other detectors. Even more important, there is developing a better understanding of the "classic" principles of patrols, ambushes, night operations, pursuit, police operations, intelligence, and use of indigenous forces, so that modern technology is beginning to be used to aid classic operations, rather than in a mistaken effort to supplant them. Thus the technological factors that tend to lead to some comparative "powerlessness of the powerful" on the strategic level do not necessarily lead to any corresponding ineffectiveness on a more tactical level, in which superior technology can be turned to advantage provided that its uses are properly thought through, which in turn requires that the effectiveness of the technologically superior not be taken for granted.

The following appendices deal at greater length with two of the strategic issues alluded to above: the pros and cons of the current ABM controversy and competitive mobilization.

Appendix I—Some Pro's and Con's for a Thin BMD System

(By Herman Kahn)

A. ten pro's

There are at least ten relatively persuasive reasons why a country like the United States might wish to build a "thin" ballistic missile defense system. Including only serious reasons and in order of decreasing importance (as I would judge their importance) these could be:

1. Particularly if the Soviets continue with their BMD program (or could easily go back into it), *it is important for the U.S. to be seriously in the BMD business*. If we go ahead with a thin deployment, an operating military organization would exist, manufacturers would be making equipment, there would be much more serious R&D and planning and consideration of tactics, strategies and policies generally (sincere engineers, scientists, bureaucrats, analysts and service management would both have an empirical base on which to build and be more

highly motivated) operators would be trained, reliability problems would be worked out, techniques and standard operating procedures would be devised and tested, the impact of various marginal changes would be noted, other useful, even vital, data would be collected and, in general, our understanding of many problems would be improved—including estimated of future systems' costs, performance, deployment time, and impact on various situations and contexts. Finally, a basis would have been created for further improvement, innovation, retrofit, and normal growth, and a capability would exist for rapid expansion and adaptation.

2. The capacity for "rapid expansion and adaptation" is important. *A light cover should reduce the lead time for the crash deployment of a heavy cover by anywhere from three to five years.* This is a valuable asset. International relations might deteriorate, and the country might want a heavy cover. While a heavy cover is probably not necessary today, we may not want to be in a position where it would take five to ten years to build one if the international situation suddenly required it.[1]

3. While this now seems unlikely, *the system may work well against some potential Soviet attacks.* It is usual, in the United States, when estimating Soviet—or other—planning, to assume that the other side is intelligent, has good doctrine and understanding of the issues, and suffers from little or no bureaucratic ineptitude or restraint. On the record this has been untrue. One need only examine the postwar record of either the Soviet or American military establishments to note that in many cases they performed much less well than their knowledge, resources, and technological capabilities permitted and the situation required. In other words, while the Soviets doubtless have the ability to design an offensive force that could easily penetrate the proposed light BMD cover, this does not mean that they will in fact rapidly design and deploy such a force—or even rapidly modify their existing system. For example, every United States defense analyst has known, roughly since the late 1950's, that day fighters and tube fired artillery are virtually useless to the strategic air defense mission. Yet, the Soviets have spent many billions of rubles on these capabilities, at least until very recently.

4. *It seems both imprudent and unreasonable for the United States and the Soviet Union to be completely without protection against any Nth country.* While it is conceivable that the United States might be willing to remain so defenseless that any country with ten missiles is a "superpower," it is virtually inconceivable that the Soviet Union would be willing to do so. Would they allow a situation to develop in which the Chinese, having procured two or three dozen missiles, would be able to destroy 10 or 20 Soviet cities? There is no hint, no evidence, that the Soviet Union will do so. We have in the past spent something like three or four dollars on offense to every one on defense; the Soviets have probably spent something like three or four to one on defense over offense. On the record, they prefer defense and probably will continue to do so. Except for a few Soviet arms controllers who have spent time with Americans and Europeans and are heavily influenced by such Western thinking, hardly any Soviet planner or analyst seems to think of "defense" as aggressive or destabilizing.

It would seem a major interest of both the Soviet Union and the United States that there be at most two nuclear "superpowers." But if both of these nations have no ballistic defense systems, any country with a Polaris submarine is a "superpower": it can destroy perhaps ten big cities. Polaris-type systems or reasonable substitutes are becoming relatively cheap and simple. If there is no BMD in the Soviet Union and America, this situation—continued for any length of time—would be likely to tempt many countries to acquire nuclear missiles. They would become "superpowers." At that point, both the Soviets and the United States probably would purchase BMD systems. On the other hand, it probably would prove fairly easy for the Soviet Union and the United States to keep their defenses ahead of any Chinese offense, and perhaps ahead of the French and British (or Japanese, or German?) offenses as well. One assumes that the superpowers will eventually find it necessary to do so. I am, of course, not suggesting that the desire to be a major or superpower is the only, or even the dominant, potential incentive for a country to acquire nuclear weapons. It is, however, one which the U.S. must take seriously for planning purposes because it involves us more directly than a nuclear weapons program which is generated by local ambitions and conflicts. There may also be a temptation to qualify for the major league once a country is in the nuclear business even though this did not constitute an important motivation for getting into it in the first place.

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[1] See later discussion on Preattack and Phony War Mobilization Bases.

5. *Almost any defense system introduces significant uncertainties into the opponent's calculation or large costs and/or operational degradations in his offense forces.* Even if one believes that the system can be penetrated, neither defender nor attacker can be sure. First of all there are the known or recognized physical and operational uncertainties of one's own system. Then there are uncertainties in the nature of the opposing system and tactics. Finally, and perhaps most important, there is the possibility of unknown, unrecognized, or badly estimated uncertainties. Indeed almost every weapon system the United States has deployed since World War II has had what were at the time unknown defects and/or capabilities that proved of great significance but were discovered after deployment. This is likely to be true of future systems as well, particularly with regard to such things as the vulnerability of ballistic missiles to defense missiles. While both Russians and Americans might be convinced that their systems—or their opponent's system—did not work, that does not necessarily mean, at least against some important types of attacks, that either or both systems would not in fact work—and of course vice versa.

Both sides, of course, have to worry about these uncertainties. In the first level of analysis they can play an important role in deterring an attack—since the attacker cannot rely on his plans working and it seems reasonable, that in the nuclear age, an attacker requires a high degree of certainty. If an attack actually occurs and the attacker does attempt to hedge against these uncertainties, he is likely to have adopted tactics and procured equipment that resulted in significant compromises in performance and was perhaps also much more expensive so that much less equipment was actually procured.

6. *New effects, tactics, or simple (retrofittable) equipment may be discovered which makes the system work much better.* If we had no system deployed which could make use of the new discovery, this could be dangerous—particularly if the situation were asymmetrical and the Soviets have a deployed system which could apply the new technique. I find it impossible to believe that the Soviets will not go ahead and deploy a ballistic missile defense system. Indeed, we tend to believe that they are already doing so. Thus it seems important for us to keep up with them.

7. In a world in which both sides have hundreds, perhaps thousands of alert missiles, ready to be launched on a moment's notice, *one cannot eliminate completely the possibility of an accidental attack.* If such an accident occurred, even a thin ballistic missile defense system is likely to work extremely well, since there would presumably be only one (or a few) offensive missile(s) to handle. It could repay the entire cost of the missile system several times over if one accident were prevented. Indeed, this could be considered a simple, but essential, normal, peacetime precaution.

8. Even a thin BMD promotes *a useful "facade" for psychological and political warfare or for defense against such warfare.*

Let us assume that one side or the other in a confrontation was completely naked while its opponent had at least a facade of a ballistic missile defense. The opponent with the facade might then have a number of advantages. First of all, it could claim that it believed that its facade worked. The other side could not be sure that this belief was wrong. It might therefore fear to press the first side too hard since the first side might, mistakenly it is true, precipitate some crisis in the belief that this facade or protection gave it an advantage. While this belief might be wrong, it now had a credible threat and therefore the first side might easily back down. The effect may be increased further when it comes to the others' estimate of the behavior of the two sides. Allies, sympathizers, neutrals or unfriendly powers all may argue that the side with the ballistic missile defense system must have believed it was valuable, otherwise it would not have spent money on it. Consequently it must have an edge over its opponent. To put it somewhat more clearly, the side with some kind of defense now has an excuse for being firm or arguing that it will stand firm. The side without the defense correspondingly has an excuse or a motivation for backing down, or strong incentives for accepting arguments in favor of backing down.

It should be noted that this argument still holds, but is substantially weaker, if both sides have BMD. Now the argument must be, my BMD is better than your BMD, or I believe my BMD is better than your BMD. In either case, the asymmetry is nowhere near as stark and the arguments are herefore correspondingly less persuasive, though they may still be persuasive enough to be useful in certain marginal situations. For example, if some of the nationals of a U.S. ally wish to argue that the United States might come to their support in an intense crisis or

even wage war to revenge their annihilation, they can point to the existence of the U.S. BMD system as evidence of the credibility of the U.S. commitment. The lack of such a system could make the consequences to the United States so incredibly stark that even the most friendly foreign citizen may find it impossible to defend or rely on the concept of U.S. protection or revenge. It is important to view this problem of U.S. credibility in an historical perspective, because the situation has really changed dramatically over the last couple of years: As things used to stand—during the fifties and through the mid-sixties—in any serious crisis the Soviets were more likely to back down than the Americans. It is, of course, common to decry both the practicality and value of such strategic superiority. Many will argue that since both sides have "overkill" capability, the notion of strategic superiority is meaningless, degenerating to a useless superiority in the number and/or quality of weapons and not to the possession of any usable capabilities.

This view has probably not yet been tested until roughly 1968 or 1969. Up to that point, the United States strategic forces were relatively well protected and, compared to the Soviets, rather numerous and capable. As a result, any U.S. negotiator could explicitly or implicitly say to a Soviet negotiator, "As you know, if this ever came to a serious showdown, you would be unable to launch any serious attack on U.S. strategic forces. You could only attack U.S. cities, which would, of course, be suicidal since it would immediately be followed by a retaliatory city attack of our own. You would therefore be deterred from launching such an attack. We, on the other hand, do have a capability to launch a very serious attack on your strategic forces and largely disarm you. Indeed, we can probably do this without killing many Russians. No doubt some of your strategic forces will survive, but they will be relatively limited in effectiveness. While they could do great damage, they could not wipe the United States out. The contrary would not be true of our retaliatory blow if you tried to use your residual strategic forces in this way." While the details were both unknown to most Americans and all-important, it is reasonably clear that both the Americans and the Soviets have had some inkling that the above threat was possible. Of course, the U.S. negotiator would have added that all of the above was irrelevant since the two countries were not going to come to that kind of a showdown; nevertheless it was interesting to note that if they ever did, the United States had a rather substantial and important kind of advanage.

The foregoing is intended to emphasize that one new thing about 1969 is that this strategic advantage will either have disappeared or be close to disappearing. For the first time, the Soviets will have a sense of strategic parity with the United States. We know that the last time that the Soviets had a sense of coming superiority (during the so-called missile gap period of the late fifties and very early sixties) they tried to convert this into political gains.

It should be noted in this respect that even a pro forma and operationally meaningless superiority may be psychologically very important. The side possessing it is likely to feel entitled to something for its extra strength, and in these kinds of negotiations "feeling entitled" is often a very useful card. I will not continue the discussion of the meaning and implications of strategic superiority here but simply note that the seventies will be the first postwar decade in which it seems likely that the Soviets will not feel any such restraints. While few are concerned about this development, any prudent U.S. government must now take some new possibilities into account.

9. BMD could be an important factor *forcing the Soviet Union to carry countermeasures in its missiles and thus making for reduced-yield warheads.*

In fact, even the thin BMD system might be reasonably effective in forcing the Soviets to modify their warheads and their tactics, particularly in regard to ground-bursts versus air-bursts, in such a way that if deterrence failed and war actually occurred, the actual damage to the environment in the U.S. and possibly even to cities and people, might be sharply lessened.

10. *Having a BMD system might cause a useful change in the threshold against exemplary attacks.*

One of the fears of the nuclear age, particularly in a balance of terror situation, according to many analysts is that if the power is extremely naked there are all kinds of threats which can be made against it by other nuclear powers, particularly very precise texts of blackmail threats or of punitive or exemplary attacks that can be carefully designed to maximize political advantage and to minimize possibilities of getting into trouble. And yet even a primitive ballistic missile defense system makes such careful design almost impossible. It is hard to decide

how seriously to take these possibilities, but since many theorists and novelists are willing to take them seriously it seems only prudent to add some additional discouragement to such attacks.

B. SOME GENERAL DISCUSSIONS

There are, of course, a number of disadvantages to deploying an ABM system. It is worthwhile considering them. Let me begin with some of the general reactions people usually have to almost any defense deployment. The following reactions seem common:

A. The deployment *is ineffective* and will accomplish nothing.

B. Deployment is *much too effective* and will either give the government inordinate confidence, in effect, encouraging risk-taking behavior, or stimulating the arms race.

C. Both A and B above.

D. Neither A nor B above.

E. While the deployment is not effective enough to protect people in most circumstances, it provides a facade of protection, stimulating both the arms race and risk-taking.

F. The deployment while of very limited effectiveness is effective enough to warrant its various economic costs but not so effective as to increase the tolerance for risk-taking policies or to stimulate a major acceleration of the arms race.

G. The deployment is effective enough to decrease casualties under many attacks, and while there are some scenarios in which you might increase the tolerance for risk-taking, in other situations one might create a minor stimulation of the arms race, neither of these last, of course, would seem to loom large enough to balance the benefits. This is not because one does not take very seriously any increased tolerance for risk-taking or even the smallest augmentation of the arms race, but because the first is most likely to occur only in scenarios where one might actually wish for increased tolerance and the second one seems to be so small as to be in fact negligible.

It is presumably clear to the reader that I would take position G as being closest to the facts of the case. Of course, the actual situation, in terms of the dangers of subtle but constantly important effects, is really quite complex and is likely to be heavily dependent upon the exact context and perspective of the analyst and of the ways the two major actors actually carry through their policies. However, as far as the most significant issues are concerned, I would argue that almost all of the pro's mentioned will exist and are in fact significant.

Some of the con's that I am now going to discuss are often either specious or unreal, at least in the context being considered. This is likely to be especially true in the case of a thin deployment mainly designed to protect SAC bases, but I would argue that it is likely to be true even of a thin deployment designed to protect cities. Let us nevertheless consider some of these con's and their significance:

1. Probably the most frequent and most important con is the possibility that an ABM deployment will stimulate an arms race, or that it represents a significant escalation in and of itself. It is important to realize that simply adding a new kind of equipment does not necessarily represent an escalation in the arms race. Thus to many individuals who were very concerned about the substitution of missiles for bombers in the 1950's this substitution looked like a very s erious escalation because it seemed to displace a relatively safe system (it was difficult to keep bombers on alert and even after they were launched with bombs aboard, 5–10 hours would have to pass before they dropped their bombs on their target) with very frightening missile systems (frightening because they could be kept on literally 15–30 second alert and because it took them only 20–30 minutes before they dropped their bombs on target). Today almost all analysts are agreed that much of the last decade and very likely the next decade or so will be significantly safer because of the introduction of these missiles and that the bombers were in fact vulnerable, accident-prone and even likely, under some circumstances, to lead to pre-emptive action for purely technical reasons and that in almost every way the missiles constitute a more satisfactory and desirable strategic force from the arms control point of view.

2. Possibly the most plausible motivation that many people have for preventing the deployment of a ballistic missile defense is the hope that this will accomplish a stop in the rapid rate of change. I have indicated elsewhere that every five years or so seems to see a major revolution in the art and technology of central

war. As a result, ideas formulated in one period may easily be obsolete and inappropriate or even dangerous five years later. This is a most difficult kind of thing on which to try to make arms control treaty and people have the very sound instinct that if they could only slow the thing down, there might be a much greater chance of learning to cope with it.

It is however of great importance that if such slowing down be achieved that it be accomplished in regard to the policies of a situation that is reasonably viable. I could easily imagine preferring what is basically a poor situation, but one which is somehow understood, to a new situation which might be in some objective sense easier to deal with, but only after some five years of learning. I cannot imagine paying an enormous price for this understanding; particularly not when the the scenario actually involves an attempt to stabilize what is literally unstabilizable.

I would argue that the attempts to stabilize a position of absolute nakedness is neither feasible nor desirable and that the specific issue on which the proponents of arms control have chosen to fight is probably one of the worst issues they could have chosen (one of the reasons why I chose to oppose them so strongly). Not only are the general arguments for having a certain amount of defense in any stabilized system fairly good, but in particular, in the era of the MIRV it will seem to be most important to be able to have a defense of at least hardened missile sites (this is of course the main objective of the program that has just been announced by the President and to that extent it is even less controversial than the initial Sentinel program.

Today's debate on the anti-ballistic missile (ABM) system does not create the sophistication that, for example, the civil defense debate did—in part because, as far as the public is aware, every expert is against ABM—the opposition is all one really hears in public discussion. The fact of the matter is that the overwhelming majority of expert opinion within the government, and among most full-time consultants as well, is very much in favor of ABM. This is not to say that the full-time consultants are right and others wrong, but only to note that people cannot tell from the public debate what is happening. Even if those engaged in this debate have a rather high level of sophistication, they tend to vote according to their politics—and today I judge that this means on the one hand—at least as far as the part-time people go that "academics are liberals and liberals are against defense," while as far as the full-time people are concerned, most of them are for adequate military preparation.

The most interesting aspect to me, however, is the lower level of debate acceptable to the public. Today it is possible for an expert to say that since defense cannot be one hundred per cent certain, we cannot depend on defense but must depend on disarmament (as if disarmament could be one hundred per cent certain) and escape challenge. Or people will assert, without much elaboration, that defense is worthless as far as saving lives or property is concerned, and at the same time so frightening that the other side will sharply accelerate the arms race. This, of course, might be true if one side or the other, or both, were mistaken, but the contrary case is, a priori, equally likely to be true in that both sides still have more than enough hostages after defense has been installed—and yet millions of lives might be saved if deterrence fails. The proposition that BMD is incompatible with any arms control arrangement pertaining to strategic weapons systems, seems based more on an extrapolation of the assured destruction doctrine than on any serious analysis of Soviet outlooks or of the actual alternatives in terms of force postures. I should want to mention in this connection, the potential availability of a posture which I have labeled "Arms Control and Defense Emphasis."

An Arms Control and Defense Emphasis position is one which tries to make clear that defense is not necessarily antithetical to arms control. In fact, if one had to choose between a strategic balance in which a number of countries were allowed to have very large defense budgets, possibly as large as they wished, but with severe limits on the offense, or one in which there were large offense budgets but very severe limits on defense, the first might be preferable for a number of reasons, the most important of which are: (1) It is very cheap to get into the offense business if there is no defense; therefore, with some caveats (which may easily be neglected) anybody can become a large power and may be tempted to do so. (2) If deterrence fails and there is war, the amount of damage will be significantly limited. (3) It is much more difficult to indulge in nuclear blackmail if one has a small offense and the opponent has a large defense. (4) There is prob-

ably more than enough deterrence for normal situations, since nobody is actually going to believe the calculations or, as a practical matter, be willing to risk rocking the boat. On the other hand, if the situation is abnormal—for example, if the other side tries "rationality of irrationality" tactics—resistance to these is likely to be much more credible.

3. Because it is not directly and simply related to deterrence of direct attack on the United Staes, BMD is at least in part—what we sometimes call a "war-fighting" system and thus seems to assume that deterrence may fail. While I myself am generally in favor of objective capabilities, avoiding facades and purely psychological deterrent, I am sympathetic to those who fear the results of an inordinate preoccupation with objective capabilities. Too great a preoccupation could induce arms races or even excessive risk-taking. One can easily imagine a very intense crisis in which the existence of a theory of survival—even if only based on uncertainties—might seriously modify behavior towards greater willingness to stand firm—or even take greater chances. Yet I would also tend to think that one gets more rational behavior from a government if its policies are based upon relatively objective capabilities. Simple "resolve"—a simple insistence on holding firm because one "must" hold firm can be disastrous when it is accompanied by an unwillingness to face the consequences or deterrence failing. In such a case the government may be forced into illusioned and unthinking rigidity or even a reckless optimism because it cannot afford to make serious calculations.

(I must add that I find it surprising that most of the people who are anxious to stop BMD and create a situation where—if the other side or the situation is making credible threats of nuclear eruption—the government cannot possibly delude itself as to the apocalyptic implications of "standing firm." Almost all of these individuals lived through the Nazi period when precisely this "war is unthinkable" attitude was exploited by Hitler. Hitler, of course, said to his opponents, "one of us has to be reasonable and it won't be me." He proved that deterrence could be offensive as well as defensive. In an offensive deterrent situation, the irrational or irresponsible have a clear and possibly overwhelming advantage over the sober, sane, prudential and reasonable people. For this reason it probably is wrong to try to make the balance of terror excessively stark.)

4. *The system may cost much more than the proposed $2 billion a year or so.* I have, of course, been in the business of weapons systems studies for almost 20 years and I am very familiar with the likely rise in a system's cost over the original estimates. There are generally two important reasons for such a rise in cost. These are an initial mis-estimate of costs in the proposal itself and an increase in the scope of the system beyond that which was originally proposed. I would argue that the first possibility is relatively small today, at least in terms of increases by a factor of 2 or so. BMD is a thoroughly studied problem, well past the point of systems definition. We have a good deal of hard data—and even some contracts. It is therefore almost impossible to believe that this system could not be built fairly close to the current estimates. It is a very different thing, in other words, from the F–111 situation, in which we had little idea of what the plane would actually be like or how one would go about designing and building it. There obviously are many uncertainties remaining in the proposed missile deployment, but the range of uncertainties does not seem to be as large as was the case in the F–111 project. On the other hand, it is very possible that the system will change in character. But this is a matter of conscious government and public decision. And while one sympathizes with those who fear allowing the nose of the camel into the tent, I do not feel that the record of the past has been particularly bad in this respect. Given my view of likely political developments in the future (which is that the general public is likely to be very negative on defense) unless the government judges it really does need an enlarged or changed system and can make a good argument for it, it is hard for me to believe that there will be any quiet unnoticed expansion. And I believe that the case for the thin area defense is so good that I would proceed with it even if there was some risk of this sort.

One possible motive for expansion, which was very seriously considered and emphasized in the past, seemed at the time—and still seems—so remote as to be almost laughable. This is that local communities would demand missile defense because they would feel naked and fearful without much protection. We know from the experience of the Nike-Ajax and Nike-Hercules programs that such a demand did not materialize—in the slightest—in the past. For a number of technological and political reasons it seems even less likely in the case of the proposed system. In fact, the recent public opposition to the co-location of Sentinel sites with populated areas, suggest that the political pressures may indeed push in

the opposite direction. This concern would seem to arise more out of almost paranoid fears of defense (or of the "military industrial" complex) than out of any rational assessment.

5. Another common objection to BMD, and one raised recently by Dr. Kistiakowsky, is that the system is too complex to work. This is certainly likely to be true if the system operates on a one-time basis—with no realistic practice. It is also likely that there may occur very special conditions when it may not work. On the other hand, in this country we have actually been quite good at making complex systems work. We recently had an Apollo in orbit, and it was a very complex system. One reason you want to get into this business is to learn how to make BMD simple, dependable and reliable. This cannot be done in a short period of time. It takes experience, organization procedures, manuals, and so on, and is one of the main reasons why I think the country should go ahead with the deployment of a ballistic missile defense. The problem of devising reasonably or adequately realistic exercises is one that the people concerned should be aware of. If they do not neglect the problem (including checking up in a reliable fashion on the likely and natural optimism of the service operation) this problem looks quite solvable. It should also be noted that it is in some ways a competitive problem. The other side's penetration tactics are also likely to depend on the efficient operation of many hundreds, perhaps thousands, of relatively involved mechanisms. It might therefore happen—in practice—that the system operated an order of magnitude or so better than expected, because of the unreliability of some aspect of the offense. This could happen even if the defense was also degraded because of operational unreliabilities. Of course the opposite could also happen but it is important to notice that the situation is not completely asymmetrical.

Appendix II: The War of "Competitive Mobilization"

Thermonuclear war seems unlikely during the next decade—in so far as it is possible to estimate the future from present conditions and trends (although the existence of the Vietnamese war makes this a much less secure analytic statement than would otherwise be the case). Obviously, it is almost as unlikely that—without war—the United States will in this decade start to spend $50 to $200 billion per year on central war capabilities. Today the United States devotes some $8.1 billion to the capability to deter or fight a central war—or to bargain with its threat. Yet, if a war suddenly seemed imminent, or even substantially more plausible than now, we would probably be willing to spend even larger sums. Under present conditions we probably would spend it badly. If, however, we were *prepared to spend* it well we might not only be in a vastly improved situation in a tense situation, but we would also, *even in a "normal" situation, without a crisis*, be in a better deterrent and bargaining situation.

Whether we would actually have the time to spend, say, $50 to $200 billion a year if international relations deteriorated gravely is a crucial question. It is my opinion that we might. In a crisis—in the case say, of an "intolerable" provocation by the Soviets, a "seizure of Berlin"—the President would have to choose among attacking the Soviets in circumstances where devastating retaliation would be possible or even likely, threatening to attack with the risk that the threat might have to be carried out, or accommodation. With a large mobilization base he would have another choice. He could temporize in the immediate situation—"phony war" (as might be inevitable in any case)—and rapidly, in a preplanned and prepared manner, employ the overwhelmingly superior American industrial and technological base to build up the kind of superiority which would make much more likely either accommodation by the Soviets or, if it came to central war, an improved war outcome for the United States. (There are certain risks and disadvantages to this option as well, as we will note below.)

The basic scenario might go as follows: In the period preceding the crisis the United States has spent perhaps a billion dollars a year on plans and preparations for massive mobilization. There is a Soviet provocation (e.g., they "take Berlin"). We do not attack the Soviet Union. We do declare war and begin the pre-planned mobilization of strategic and general forces, including active and passive defenses. (This could include deploying a space defense system which attacks missiles in the boost phase, mid-course defense systems, high-altitude "Sentinel" intercepts, terminal BMD, blast shelters, and other ground or underground protection.) Within two to three years overwhelming superiority in central war forces and a large improvement in local war forces has been achieved. The United States then

is in a position either to execute a disarming strike on the Soviet Union, followed by a demand that they accept our terms, or to use local forces under the umbrella of a central war superiority to redress the local situation.

This scenario goes the full course. But as with other capabilities there are great benefits even if the "mobilization buttons" are never pressed—or pressed only half-way. We have, perhaps, become over-familiar with the idea that forces are valuable even if they are never used—i.e., if they successfully deter. It is worth noting that, similarly, a plausible possibility of truly massive and effective mobilization of American resources for military purposes provides an important factor in international affairs even if it is never used. A potential opponent may be anxious to avoid actions which can provoke American mobilization. Even if this first deterrent fails, the forces still may not be used for destructive purposes but for coercion. We must, of course, be prepared for the possibility that they will (partly) be used, but there are at least four variations to the basic scenario which are of great importance and which alone might justify the study and procurement of a mobilization base.

1. The study of massive mobilization may prove an excellent mechanism for improving the regular research, development, and procurement process—particularly if it is designed with this as a definite purpose. This by-product could in practice actually prove more valuable than the "primary" purpose.

2. The concept of a "spectrum" of deterrance can be extended to include *competitive mobilization* as one form of conflict. Competitive mobilization is a part of the total spectrum in which the United States is relatively strong, and it thus may be desirable to bring it into greater prominence. Any program that increases sharply either the plausibility or the capability of the United States to carry out massive mobilization may greatly enhance its over-all deterrent position.

Indeed, a massive mobilization program would pose a dilemma for the Soviets. If they initiated their own program of mobilization preparations they would study our capabilities, and the more detailed and careful this study the more likely it is to be profoundly discouraging, i.e., deterring, to the Soviets. On the other hand, if they make no serious effort to prepare themselves, our inherent advantages in competitive mobilization will be greatly enhanced.

3. After we initiated a mobilization process, the Soviets might feel compelled to "buy us off." They might try to "appease" us enough to weaken our willingness to continue to pay the costs of mobilization. We might, in this situation, at the minimum, achieve our original deterrence aims, and possibly even some of the aims for which (without mobilization) we might have made resort to war. (E.g., to stop our mobilization the Soviets might evacuate Berlin, or make other concessions which nullified or counterbalanced the impact of their taking Berlin. Obviously, we are here comparing incommensurable costs and gains. But this is equally true in a war. Competitive mobilization can be thought of as a form of war.)

4. When we completed the mobilization, instead of executing a disarming attack we might simply deliver an ultimatum. If our superiority were great enough, there is a good chance that the ultimatum would be effective, particularly if it were limited to "achievable" aims.

Many think of the arms race as a dangerous and undesirable process. While this involves complicated concepts about which there is substantial controversy, and where understanding is generally unclear, the following can be argued: When we and the Soviets spend vast sums on strategic forces, we each maintain an ability to create massive destruction in the other's country. We thus maintain deterrence but we spend a great deal of money to do so, and the result—if war occurs, perhaps through accident—would probably be immensely destructive and probably to both sides. (Some people would add that a relatively rapidly changing technological situation increases the likelihood of war by producing misunderstandings about the nature of forces and their effects, or perhaps in other ways.)

This picture of the arms race and its results seems plausible for moderate increases over present levels of spending on both sides, perhaps up to a factor of two, depending on strategic forces. In this range it seems that, roughly speaking, the effect of one side's spending money can largely be nullified or counteracted by the oher side's spending money in appropriate ways. There are, of course, arguments about whether the other side will decide to spend enough money, whether it takes more or less money to counteract a given expenditure, and the like. Yet the basic argument is rather widely accepted.

One of the interesting questions that arises in the case of truly massive competitive mobilization, assuming the above relationships obtain at low or moderate

levels of the arms race, is whether they will also obtain at high levels. Another question is whether we can effectively spend substantially more in a useful way in a given period of time—say two to five years—than the Soviet Union, and if so, whether that difference in expenditures (which we might characterize as at the level of approximately one trillion dollars) could really produce the kind of superiority that seems unachievable with more moderate differences in strategic force budgets.

To analyze this question let me review briefly the basic elements in competitive massive mobilization. Each side is trying to develop forces which can attack the other side's population or resources without being damaged in return. This probably, but not necessarily, involves being able to reduce or destroy the enemy's offensive forces, at the same time protecting one's own population and resources by active and passive defense and intra-war deterrence. There are two complicating themes that in some ways interact with this basic relationship. First, the enemy may retain the ability to destroy population or resources in other parts of the world. What then would be the relevance of a residual Soviet ability to damage Europe, Japan, India, South America? The second sub-theme that needs exploration is the significance of a parallel mobilization of conventional combat forces.

Another conceptual question is, "is there any sharp instability in the mobilization process?" Consider the following analogy: If there is a ground war between two countries with balanced air forces, neither air force has much effect on the ground war since for the most part the air forces battle each other. But if one side can gain air superiority, either destroying the enemy's air force or forcing it out of the skies over the battlefield, there is a sharp change. The matter then is one not of air-versus-air but of air-versus-ground. When there is an unopposed air force over the battlefield the question then becomes how important that air force is. Perhaps in massive mobilization the appropriate question would be, can one side gain dominance in some area—such as space—so that only it can use that area for defense and attack? In that case we must ask how well that area can be exploited against the other side. At least conceptually, such space defense systems as BAMBI seem technologically practical—even if inordinately expensive by current standards.

1. PROTECTING PEOPLE

People are relatively easy to protect because they can be put in shelters, but undefended they are a wholly vulnerable target. The principal problem is whether people are in the shelters when the bombs land. One parameter of interest is the number of people that are killed by a delivered bomb of one-megaton equivalent. For unsheltered and undispersed population a reasonable range of values for this parameter is 50 to 500 thousand people per megaton equivalent. For an adequately sheltered population (programs costing between 20 and 100 billion dollars) the value might be between one hundred people and ten thousand people per megaton equivalent—where the lower number holds for very dispersed systems.

2. PROTECTING THE ENVIRONMENT

Two special problems of defense are raised by massive arms races. It probably is reasonable to think that passive defense preparations (costing between 10 and 100 billion dollars) could protect an adequate recuperation base in the case of careful countervalue attack against the United States of perhaps 5,000 delivered megatons. Indeed, 5,000 megatons may be a conservative specification for a passive defense effort which devotes tens of billions of dollars to preparing for recuperation. On the other hand, at this scale of attack, one begins to lose faith in calculations. They depend upon an intellectual structure that is so large, complex and untested, as to be an unreasonable basis on which to hinge national survival.

A related issue arises when attacks greater than 5,000 or 10,000 delivered megatons are considered. This issue is damage to the environment. Again, while at least at the lower end of this range it may be reasonable to expect that the effects of large-scale fires and heavy fallout contamination, etc., would not be out of scale with other kinds of damage, one must be concerned for possibly unknown effects and losses. Generally speaking, successful active defenses might provide some remedies for these problems. Explosions very high up may not cause substantial damage (although there is some possibility that thousands of megatons exploded in a short period of time in the upper atmosphere or beyond the atmosphere could have effects that are as yet unknown).

One must also acknowledge the possibility of accidental (or deliberate) Doomsday machines. A "Doomsday machine" is (in this context) a system which accidentally (or deliberately) causes very great harm on a world-wide or near-world-wide basis. One example is if a nuclear war were to put enough fine dust particles in the upper atmosphere to harm the world's climate. There are very large uncertainties about this. Using Robert Ayres' calculations,[1] concern about this possibility is warranted if there are something more than 10,000 megatons groundburst world-wide. (Note that for this effect all megatons are equally harmful, whether fission or fusion, and no matter where in the general latitude belt they are exploded, including in Russia, so long as they are groundburst.)

We need not speculate here on the techniques the Russians might use if they wished to build a Doomsday machine. No doubt if they were willing to spend tens of billions of dollars and to accept the risk of fundamental degradation of the world environment they could cause substantial destruction to the United States without penetrating U.S. active defenses with missiles or planes. While it may be unlikely that they would deliberately build or explode a Doomsday machine, it is not unreasonable that a very large arms race and state of war between Russia and the United States could inadvertently produce as its end result a Doomsday mechanism.

A sample mobilization scenario

A mobilization scenario might begin with the United States starting preparation of a pre-mobilization base in the 1969–1970 period, with mobilization itself touched off by a crisis in the early or mid-1970's. (A prototype situation, of course, is furnished by the events of the last half of 1950. In June of that year the United States was debating a defense budget in the $16 to $18 billion range. Thirteen billion dollars had been spent in fiscal 1949 and many people believed that $18 billion could produce serious financial strain if not bankruptcy. In June North Korea attacked South Korea. Before the year was over Congress had authorized over $50 billion. But it took almost three years for that money to be spent.)

In our scenario perhaps a billion a year has been spent on a capability for large and rapid mobilization. In addition, the gross national product (in the early and mid-1970's) is more than three times that of 1950, or well over a trillion dollars. The pre-mobilization defense budget itself would probably be in the region of $50 to $100 billion a year, providing a substantial base for expansion. In a serious crisis Congress might authorize an additional trillion dollars worth of expenditures. There undoubtedly would be hope that the other side would settle before this money was fully spent, but the authorizations would exist and the outlines of the future defense posture would become relatively clear—in itself an intimidating prospect for the opponent.

In the first year the United States might send abroad one or two million additional troops with something more than 6 million men in the armed forces before a year was over (we assume some 3 million men in the forces at the time of the crisis). In many overseas areas there would be extensive nuclear support and an ability to wage tactical nuclear war if necessary to avert defeat or to deter the other side from using nuclear weapons. There might also be a declaration of United States intent to use nuclear weapons in defense but not in offense. If the other side initiated nuclear weapons use on the territory of an ally of the United States, the United States would retaliate against the enemy homeland—i.e., distinguishing between "interior" and "exterior" escalation (interior escalation being on one's own territory and exterior escalation being nuclear use on the opposing side's territory).

Before the first year was over, sums between $50 to $100 billion would be spent on civil defense preparations. (The U.S. construction industry today could turn out $100 billion worth of construction in a year if blueprints were ready and simple, and relatively inexpensive preparations had been made to eliminate bottlenecks.) By the time the other side had procured weapon systems relatively efficient against this level of defense posture, we would have improved our posture and might have active defenses good enough to defend against anything short of a near-Doomsday machine.

The first year probably would not produce large changes in the active defense posture or the strategic offense. By the end of the second year one could expect an almost unlimited availability of missiles, radar, computers, and the like, for

[1] Robert U. Ayres, *Effects of Thermonuclear Wars on Weather and Climate*, HI–303–RR/AIV (Croton-on-Hudson, N.Y.: Hudson Institute, 1964).

existing systems (and for some new ones). By the end of the third year one can imagine the deployment of elaborate and completely new systems—space defense systems, elaborate mid-course defense systems, new kinds of high-altitude area defense systems, and finally, even new, or old, terminal defense systems. One can also imagine a dense coverage of the seas for detection and destruction of submarines. Air defense, including low-altitude coverage, would have been vastly improved. Systems which today are thought technologically infeasible would prove feasible. (This, of course, has happened before. If there had been no Korean War and the U.S. defense budget had stabilized at around $15 billion, the B–52 weapon system, Minuteman, Polaris, SAGE, and other systems would have been rejected as "technologically infeasible.")

In the third year the defense budget presumably would be about 30 to 40 percent of the gross national product, or around $500 billion a year. (A greater proportion of the U.S. gross national product was being spent at the end of World War II when, for at least a few months, substantially over 50 percent was allocated to defense.) Nothing like this would be available to any potential enemy of the United States, including the Soviet Union, simply because the U.S. gross national product is twice as large as any potential opponent's and its short-run flexibility of production probably is also substantially greater (due to an extraordinarily well-trained work force, a very complex and versatile industrial complex, and other characteristics).

The kind of mobilization I have described could prove very intimidating: in some ways almost as intimidating to Americans as to an opponent, and yet considerably less intimidating than a major nuclear war. It might prove a surrogate war—changing the balance of military forces by increasing one's own offense and defense capabilities rather than changing it by destroying enemy weapons. To the extent that it would be a temporizing measure, either averting the necessity for a war or even eventually allowing it to be fought in a more advantageous way, and to the extent that it reinforced pre-crisis deterrence and its degradation of intra-war deterrence were appreciated, it clearly would seem to deserve serious consideration.

Mr. ZABLOCKI. Thank you.

Dr. Schelling.

STATEMENT OF DR. THOMAS C. SCHELLING, PROFESSOR OF ECONOMICS, HARVARD UNIVERSITY

Dr. SCHELLING. Mr. Chairman, rather than read my statement I will summarize it briefly, sir, and make a few remarks in response to Mr. Kahn, if I may.

Mr. ZABLOCKI. Very well.

Mr. Kahn, may I say you can present your revised paper whenever it is ready. Both of you gentlemen will have an opportunity to revise and extend.

(The prepared statement of Dr. Schelling follows:)

Mr. Chairman and members of the Committee, you have asked, in your agenda for today's session, what changes in strategic thinking have resulted from the *technological progress* of the past decade. Let me add "intellectual progress." We think differently now, partly because technological progress obliges us to but partly because we have been thinking and talking and writing and holding hearings and preparing budget justifications and negotiating with allies and enemies during this past decade.

There is even a third element that deserves notice in addition to technological progress and intellectual progress—the sheer passage of time.

In 1960 it was only fifteen years that nuclear weapons had gone unused, and but ten years since the first occasion—the Korean War—when nuclear weapons might been used and were not. In 1964 President Johnson said, "For nineteen peril-filled years no nation has loosed the atom against another. To do so now is a political decision of the highest order." We have added four-and-a-half more years to those nineteen.

The tradition of non-use, the somewhat self-confirming expectation of non-use, grows stronger every year. We have preserved that tradition; and as we contemplate the miltiplication of our strategic problems by the possible multiplication of the number of nuclear-armed countries in the world, we shall more and more appreciate that curse on nuclear weapons.

There is such a curse. It was there to begin with; all of the dead and some of the survivors of Hiroshima and Nagasaki contributed to it. The nuclear test ban reinforces it. And, for the most part, our government and most other governments have abstained from anything that would belittle the "unconventional" status of nuclear weapons.

Similarly, since 1960, we have survived almost another decade, one that included some acute crises, without the deliberate, the accidental, or the panicked initiation of thermonuclear warfare. It was in 1960 that a distinguished writer on science and government stated it to be virtually a "mathematical certainty" that thermonuclear war would occur before another ten years were out, even if only by accident, unless something very drastic happened—more drastic than anything that has happened—to the world's armaments and international relations. In retrospect that looks like a poor prediction.

I doubt whether anyone will renew that prediction for the coming ten years. And the mere fact that we and the Russians have coexisted for most of another decade, with nuclear weapons designed for each other's destruction but not destroying each other, not only is reassuring but, by reassuring us both, should make it less likely that either country will jump, stumble or plan its way into thermonuclear war.

The decade of the 1960's opened in the midst of what I call the "vulnerability revolution." It was then that it became widely and, I believe, quite suddenly appreciated that the most crucial characteristic of any retaliatory strike force was its vulnerability or invulnerability to sudden enemy attack.

It was evident by the late 1950's that ballistic missile payloads and accuracies, and the yield-to-weight ratios of thermonuclear warheads, could make it possible for a very few strategic weapons to destroy a great many strategic weapons, in a surprise disarming attack. Unless the retaliatory weapons to be attacked were protected, hidden, dispersed, or provided with good warning and quick reaction, their vulnerability would not only tempt surprise attack but invite pre-emptive attack in a crisis.

Hidden Polaris and dispersed Minuteman, later hardened and dispersed Minuteman, seemed to meet this criterion. The missile systems they replaced were considered obsolete even before installation, on grounds of vulnerability. Strategic bombers were put on a greatly improved ground alert, provided a ballistic missile warning system, and even some degree of airborne alert at some times.

Furthermore, the surprise-attack negotiations of late 1958, in Geneva, drew attention to the vulnerability of retaliatory weapons systems as a primary problem for arms control. And for the first time some genuine common ground was discovered by those primarily interested in strategic deterrence and those primarily interested in reciprocal measures for the control of armaments.

This concern with the vulnerability of retaliatory systems is undiminished, and properly so, a decade after it became the primary criterion for the selection of a weapons system itself. It is not much of an exaggeration to say that it has become also the primary criterion for the design of an arms *agreement* between the United States and the USSR. It remains the chief cause for alarm about the MIRV, whose main characteristic is not that warheads may become cheaper to deliver, or that a limitation on missiles will not stop the multiplication of warheads, but rather that MIRV technology makes it economical to cluster many warheads in a single booster, the way it used to be economical to cluster many bombers on a single air base, increasing the advantage, in case of war, in being the side that starts it.

Along with concern for vulnerability came a parallel concern with command and control. Safeguards against accidental or inadvertent or unauthorized launching of weapons received increased attention. Safeguards against the crippling of a retaliatory system by an attack on its communications and command procedures received increased attention. The problem of so-called "accidental war" was recognized to be primarily one of information and decision rather than sheer mechanical accident; and there was an effort to put less reliance on quick-reacting retaliatory systems coupled with warning, and greater reliance on weapons that, in case of uncertainty, could survive well enough to afford to wait and see, and not force hasty decisions before the evidence was in.

But if there has been both progress and consensus on the criteria for designing a strategic retaliatory system, there has been much less clarity and consensus, and I

believe less progress, on what to do if war should occur. We have measured our retaliatory potential in the number of Russians we might kill in a second strike; but we usually evade the question of whether, if war occurred, killing those Russians would be our war objective.

There is evidently widespread disagreement, even among knowledgeable people, on what it is worth to have a certain probability that casualties in this country could be significantly or substantially reduced by ballistic missile defenses. Even those who profess a strong concern for reducing casualties are far more interested in doing it by fending off Soviet warheads than by conducting the war in such a way that destruction is minimized rather than maximized. Secretary McNamara's thoughtful and pertinent suggestion in 1962 that live Soviet cities might better be treated as hostages even after war began, rather than as urgent targets for destruction, providing the Soviets the "strongest imaginable incentive to refrain from striking our own cities," has never excited either its advocates or its opponents the way civil defense, ballistic missile defenses, nuclear test bans, nuclear superiority, and other issues do.

Seven years ago, when he made the suggestion, one might argue that we and the Soviets lacked the command and control facilities for doing anything but shutting our eyes and launching everything at once. Seven years later we should have put ourselves in the position to see that, if intercontinental war should start, it does not automatically run its course as an orgy of destruction.

Ballistic missile defenses of populations on both sides may be one way, though not the cheapest way, of reducing the destructiveness of warfare. Being able on both sides to avoid inflicting maximum destruction, on condition that the other side not, is another way of holding down destruction in the event of war. It gets too little attention. Even Secretary McNamara's advocacy dampened in later years. It may, though, be less expensive than ballistic missile defenses; also, it is not incompatible with ballistic missile defenses.

Another line of thinking has emerged in the last decade and become recognized as a legitimate part of our national-defense strategy. This is the notion that not only do we and our enemies often have a good deal in common, of a kind that might be expressed in arms control agreements negotiated in places like Geneva, but that even in our weapon planning and design and procurement we should take into account our adversary's reaction, and possibly even put him on notice about which of his actions will bring about certain responses on our side.

President Eisenhower seemed quite concerned about the avoidance of a mutually provoking arms race. But I believe the explicit blending of arms control and defense planning really emerged in connection with ballistic missile defenses, the issue that is causing so muchconcern and disagreement now. Secretary McNamara and President Johnson both articulated the notion that Russian deployment would have a significant influence on our own decision and that it might be in our joint interest to abstain. They communicated that we should have to react at least with an enlarged offensive capability, and possibly with a matching defensive capability, if the Soviet Union deployed a major system.

And most recently President Nixon has proposed that a defense of strategic retaliatory weapons differs from a defense of population centers in what it communicates to the Russians about U.S. intentions and in its lack of menace to the Russians' own deterrent force.

I find it significant—more than that, I find it striking—that we have come to the point where we can engage in arms bargaining with our main adversary not under the disconnected heading of "disarmament and arms control" but in the ordinary process of defense planning and budgeting. Evidently a great deal that we do with strategic weapons is a direct response to what we think the Soviet Union is doing and is going to do; it is easy to suppose that they do not develop their strategic weaponry in a vacuum, but look at what the United States has procured, is procuring, and is likely to procure in the future. We do react to each other.

Acknowledging this and taking it into account is sensible as defense planning, not just as "disarmament planning." Whatever the prospects for successful negotiations with the Soviet Union during the coming months and years, on the subject of strategic weaponry, there could not be a greater contrast between the serious and businesslike prospects for realistic negotiations in 1969 and all the fantasy and pretense about "general and complete disarmament" that characterized the beginning of our decade.

There are two areas of strategic thinking in which we have made very little progress during the past decade. One is an old problem, and the lack of progress is not due to lack of trying. It is how to couple our strategic retaliatory capability and our regional defense capability in a meaningful doctrine.

The question whether the tactical use of nuclear weapons must lead, or need not lead, to total escalation is not one on which any of us sees closer to a persuasive answer now than ten years ago. The question whether a conventional capability in Europe or elsehere enhances the strategic deterrent, by promising timely and unflinching response, or degrades the strategic deterrent by providing evasive alternatives, is one that the American government and some European governments argued to a standstill.

Nobody wants to police the entire world simply by the threat of nuclear destruction; nobody wants to defense Western Europe with an advance commitment never to touch nuclear weapons. But no reliable compromise doctrine has really emerged in the last several years. Part of the reason is that alliances are far less capable of candid discussion of these issues than single governments, and the problems are hard enough even within the privacy of one's own government.

The other problem I would call to your attention is that of having a persuasive capability to deter, or if necessary to cope with, a major war with Communist China. I notice that those who design ballistic missile defenses pay great heed to Communist China, but I do not recall a single offensive weapons system that was publicly debated or justified on grounds that it was adapted to a Chinese threat rather than to a Soviet treat.

It is easy to suppose that, if we can kill tens of millions of Russians, we can surely kill as many Chinese as we might ever want to. What I cannot see is why we should want to. I do not believe that the calculations for a war with Russia that we are counting on not to happen should be the same calculations as for a war with China that many people think could happen.

I understand, too, that the problem of controlling and eventually terminating a major war with the Soviet Union may seem just beyond the powers of human management. For some it appears to be the end of the world anyway, and they lose interest. But a war with China would have an end, I hope, and an aftermath—an aftermath in which one cannot lose interest, however much he would deplore that war. A war with China raises the important question of how to keep the Soviet Union adequately deterred while a major war is going on. It raises the question of what our objective would be in such a war, and what our strategic-bombing philosophy should be.

I dislike mentioning this, because it sounds too war-like, and I do not feel war-like toward Communist China. My worry is that the Vietnamese War or a Korean crisis or another crisis over Taiwan or another attack on India might possibly escalate into something involving the Chinese mainland. And I would not like to see our nuclear behavior toward China guided by such concepts, like "assured destruction," as were developed over the years in relation to a very different kind of adversary and a very hypothetical war.

I like to remind myself from time to time that every Chinese civilian is the citizen of a country allied to the United States, and one of our responsibilities in case of war is to protect them and their homeland. Punishing close to a billion Chinese for the sins we impute to a usurping authority that we do not even recognize as their government, and doing it merely because this is what for twenty years we successfully threatened against Russia, and because for twenty years this is the way we equipped ourselves, would be both witless and tragic.

I feel obliged, because it is so much on everyone's mind these days, to take a position on ballistic missile defenses before I close my statement. I have for seven years deprecated such defenses, mainly because of a belief that we and the Soviet Union could jointly profit from joint renunciation and because of the opportunity that ABM presents for reaching accord with the Russians. But like Charles Herzfeld, former Director of ARPA, I do not see that either side in the debate today has a clear and obvious winning case. Some defense against Chinese ICBM's makes sense—not a compelling case, but a reasonable case. Defense of Minuteman may make sense in the era of MIRV—not a compelling case but a reasonable case. Avoidance of a defensive arms race is terribly important, but a $100 billion defensive arms race is not the inevitable consequence of a decision to proceed with a modest system; it is to be guarded against, and we can guard against it.

I am much more concerned with the decision on Sentinel or any such system be taken wisely than that the decision be the correct one. The decision ought to be tentative—dependent on negotiations with the Russians. It ought not to be a victory for either side in an ideological debate. Those who oppose ABM ought to avoid making it a decision between none at all and an open-ended commitment to a defensive arms race. Those who favor ABM ought not to make it a mortal challenge to all who hope to avoid a defensive arms race.

An intelligent decision can go either way. A responsible decision can go either way. I have respect personally for people on both sides of this issue. I'd prefer not to make it an ideological test case.

Writing this statement on the eve of an anticipated Presidential decision on ABM, I can only hope that the President will avoid accepting this issue as a sharp cleavage between two opposing philosophies. I hope he can be tentative and—to use the phrase inherited from a predecessor administration—can "keep his options open" in spite of the pressure to declare one side entirely right and the other all wrong.

Thank you for permitting me to join you today.

(The biography of Dr. Schelling follows:)

DR. THOMAS C. SCHELLING

For the past eleven years, Dr. Thomas C. Schelling has been Professor of Economics at Harvard University and a member of the faculty of its Center for International Affairs. He is currently serving as a consultant to the Defense Science Board of the Department of Defense and as Chairman of the Board's task force on strategic objectives and systems technology.

Born in Oakland, California in 1921, Dr. Schelling received his B.A. degree from the University of California at Berkeley in 1943. Harvard awarded him the degree of Ph. D. in Economics in 1951.

From 1948 through 1953, Dr. Schelling was an economist with the U.S. Government in the field of foreign aid, serving in Copenhagen, Paris and Washington. In 1958 he became Associate Professor of Economics at Yale University. He remained at Yale until 1958, when he accepted his current professorship at Harvard.

On leave from Harvard in 1958–1959, Dr. Schelling served on the staff of the Rand Corporation. During this period Rand published research reports by Dr. Schelling entitled "Nuclear Weapons and Limited War" and "Surprise Attack and Disarmament."

Dr. Schelling has served as a consultant to numerous governmental and nongovernmental agencies concerned with defense or arms control policy. These include the Departments of Defense and State, the Arms Control and Disarmament Agency, the Institute for Defense Analyses, and the Rand Corporation. From 1960 to 1963 he was a member of the Scientific Advisory Board of the Air Force. He was a member of the D.O.D.'s Defense Science Board from 1966 through the end of 1968, when he began his current consultantship to the Board.

Dr. Schelling has served as editor of a number of academic journals. These include *The Journal of Conflict Resolution*, *The Quarterly Journal of Economics*, *The Review of Economics and Statistics*, and *World Politics*.

Along with a number of books on economic topics, Dr. Schelling is the author of *The Strategy of Conflict*, published in 1960; *Strategy and Arms Control*, written jointly with Morton H. Halperin and published in 1961; and *Arms and Influence*, published in 1966. His many shorter works include *Planning—Programming—Budgeting: PPBS and Foreign Affairs*, a memorandum published last year as a committee print by the Senate Committee on Government Operations.

Dr. SCHELLING. Mr. Kahn has emphasized the determining factor of technological progress. In my paper, I tried to argue that technological progress is not really the main determinate of our strategic thinking.

We get new ideas. We may sometimes be persuaded out of positions we held. Mr. Kahn has suggested we do not think as well today as we did 6 or 7 years ago. I am not sure that is true; nevertheless the intellectual progress is often more apparent than real. We keep discovering what we knew but forgot.

I was struck by Dr. George Quester's book, "Deterrence Before Hiroshima," in which he looked at the development of strategic air-war doctrine from the invention of the airplane to the end of World War II. He found not only that many of the strategic arguments we have had in the last 15 or 20 years, like the points pro and con that Mr. Kahn has been giving about ballistic missile defenses,

not only were understood and argued and debated in the 1920's and 1930's but even in language that is remarkably similar to the language we use now.

I used in my most recent book a quotation from Winston Churchill that I thought was the one in which he introduced the "balance of terror" idea at Fulton, Mo., after the first nuclear weapon had gone off. It turned out that the quotation was from an address to Commons in 1934. I realized then that people like Herman Kahn and me—many of us whom you call on to testify—are so busy writing and arguing and testifying, that we do not read very much, except each other for purposes of occasional refutation.

On ballistic missile defenses, I am inclined to think a lot can be said for having a thin defense against the Chinese missiles, and a lot can be said against it. There is a very good case for protecting Minuteman, the case being that we may be more able to resist pressures to buy more Minutemen and Polaris if we have a reasonable defense of Minuteman.

Whatever the danger was that this would lead to a $100 billion thick city defense, it doesn't exist now. Everybody is alerted and sensitized to it, including the President of the United States. So it is not going to escalate quietly and unnoticed.

My hope, when I wrote my statement, the night before President Nixon made his decision, was less that he would make the right decision than that he would make it in a wise manner and formulate it properly, that he would not give too much aid or comfort to either side in what had become an ideological controversy. I hoped he would keep his options open. And, if we were to have a compromise, I think on the whole we have been given a reasonable case for a tentative schedule for some ballistic missile defense, with due attention to the role of negotiations with Russians.

Thank you very much.

Mr. ZABLOCKI. Thank you, Dr. Schelling.

Both of you gentlemen have given us very provocative statements.

On your final observation, then, is it safe to assume that your criteria spelled out were met by the Nixon decision and an intelligent decision?

Dr. SCHELLING. Yes; I would have liked to write his speech myself, but seeing that I couldn't, it was a decent statement and I think a fair decision.

Mr. ZABLOCKI. Mr. Kahn and Dr. Schelling, there isn't really any area of disagreement between the two of you on the antiballistic missile system, on the thin system, that I could detect. Maybe this is moot after the decision, but nevertheless it would be of interest to me at least, Mr. Kahn, with a comment by Dr. Schelling, for you to speak on the reservations that you have had about the nuclear nonproliferation treaty, particularly as it would affect our allies. Also, would you explain your position on disarmament talks? When you quite clearly stated your thoughts about the rigidity of the Soviet Union, I detected there that the disarmament talks with the Soviet Union would find some problems. Would you comment on the two issues, the nonproliferation treaty as it affects our allies, and any further discussions on disarmaments with the Soviet Union?

Mr. KAHN. On page 11, I have a note on the nonproliferation treaty which, in fact, I should probably correct.

I happen to be in favor of the treaty conceptually. I was very much against the style in which it was negotiated, in which, in effect, not formally but as a practical effect, we got together with the Russians and presented our allies with mutual agreements with the Russians. Formerly, it was always done the other way, but the practical effect is as I suggested.

This resulted in the uttermost annoyance, irritation, and aggravation in Japan, West Germany, Italy and, to some degree, India. One can make a rather good case that this annoyance, itself, has accelerated sentiment in these countries by about 5 years, just to give an estimate of a thing which cannot be estimated. That is a course which is in the past.

Today we have signed the treaty. But I think it is a course which is worth noting. Why was it made? Well, this is an answer to your second question, Mr. Chairman.

To the Russians, disarmament negotiations fulfilled many needs, one of which is to sow alliance discord and to handle the problem of Germany, which is important to the Russians. It is not to say they are completely unconscious to the worldwide problems, that they have no interest in controlling the arms race. It is to say that within their internal priorities of negotiating, the West German issue and alliance issues often seem to take precedence over the world, itself, and, therefore, we let them nip at us in this way. I think this is bad in two ways: It encourages a certain kind of behavior on the part of the Soviets and these alliance interests for us are important. We don't want to give the West Germans and Japanese the attitude that we prize certain agreements with the Soviets so much that we choose the methods of least resistance in negotiating. We treat them as the enemy, in effect, and the Soviets as the allies.

Under the rigidity issue, I ought to make the point that the Soviet Presidium tends to be tactically quite flexible. I was talking about the institution rigidity within the system.

I remember when Khrushchev wanted to change the Soviet Navy from building cruisers to building better submarines. He had to fire the admiral. He fired the admiral, as nearly as we can tell, only after 2 years of pressure. He tried to get the guy to change and he wouldn't change, so he fired him. Within that system, the level of discussion is relatively low.

One way to characterize it is a large number of Soviet decisions which are otherwise inexplicable to us is that the Soviets are refighting World War II with modern equipment. They do, for example, have a lot of day fighters in their air defense establishment. Day fighters are not thought of as particularly useful by most people. The reason seems to be that tactical air arm came out of World War II with great deal of prestige, and for tactical fighter operations day fighters are a good thing.

In a strategic campaign, if the enemy comes at night, the day fighters are useless. In a normal war, if you can't attack tonight or today, because of weather, you attack tomorrow. We phased out our last gun in air artillery in 1956. The Russians spent as much in 1956 on two tube artillery systems as on the whole intercontinental system.

It gives you like a half percent attrition. That is an important number, if you are going to make 200 visits, but it is negligible in a strategic war. Why? Because the Soviet Union has artillery people

who tend to make the key decisions, the same as in the 1960's the Air Force officers made the key decisions in the United States.

These rigidities are extremely important in trying to analyze what is going on. I don't think the same rigidities are quite as strong in the behavior of the Presidium at the negotiating level. In other words, they are, I think, rather flexibile, or at least at the tactical level, both in their own terms of one step forward, one step backward kind of thing, or the Lenin idea of refusing to compromise with infantiles. These are seriously realistic people.

Mr. ZABLOCKI. We can take little comfort that they have problems of rigidity within their military services as we find sometimes in our own.

I realize the nonproliferation treaty and the arms control are apples and oranges, but, nevertheless, Dr. Schelling, you find that we and the Soviet Union have gone along in a businesslike way on the subject of disarmament and arms limitation.

Would you care to state what the possibilities are in the future for success? If so, in what specific areas? What, in your opinion, is a ground where we can find some beginning?

Dr. SCHELLING. I think we may have already begun.

What I had in mind when I referred to the businesslike way we were proceeding was meant to be in contrast to the comparable month in the administration of President Kennedy when the language was all about general and complete disarmament which, as far as I can tell, nobody believed in, with the possible exception of President Kennedy and former President Eisenhower. I believe it was fakery on the Soviet side. It was nearly complete fakery on our side. I don't believe it impressed Indians, Mexicans, or anybody else with our sincerity.

No progress was ever made on the subject.

The present nonproliferation treaty calls for eventually getting on to general and complete disarmament. But the nonproliferation treaty, itself, is an indication that small steps along the way may be worthwhile not only as steps to something more, but something for their own sake.

Primarily, the paragraph in the NPT about looking to general and complete disarmament is a demand that the United States and the Soviet Union and, if possible, France, Britain, and China, do something about nuclear disarmament.

What I particularly had in mind, though, was this: I think when Secretary McNamara and President Johnson proposed that the decision for or against the ballistic missile defenses was not economically and technically clear-cut in either direction, that in any case it made sense to hold off and see whether the Soviet Union could be induced to hold off, because that might keep both of us from having to buy more offensive systems to penetrate each other's defenses, and it might save both of us the cost of defensive systems, that was arms negotiation with the Russians. They didn't go to Geneva and say, "We hereby propose to you". They simply made clear by talking to the Congress and by talking to the public, by being overheard by the Soviet Union, that the Russians could influence our decision if they went ahead with a big system. For good reasons or bad, we would probably feel obliged to copy them. If they didn't go ahead

with the system, the pressure on us to do so would be less. The inducements on our side to go along with them and saving ourselves money and saving them money would be greater.

I don't know whether this was perceived to be "arms negotiation." But when you can engage in that kind of diplomacy with your chief potential enemy, not under the heading of disarmament and arms control to be sponsored by a separate agency, but as a natural, obvious way for a Secretary of Defense to think about major weapon decisions, that is enormous progress in the assimilation of an arms control philosophy in the process of strategic decisionmaking. In recent years the Russians are showing some signs that they can think this way, too; and they probably do perceive that what they do substantially influences what we do.

I happen to be, with Mr. Kahn, a member of a small group, including Mr. Herzfeld who was here with you last week, that as consultants to the Defense Department have been thinking about strategic negotiations with the Russians and what kind of understanding could be reached. And I am struck with how the entire Defense Establishment, as well as the Arms Control and Disarmament Agency, not only takes for granted that this is a legitimate mode of discourse with an enemy, but even takes for granted some of the criteria and ground rules for how to judge the kind of agreement that might come out.

No longer are those who oppose arms control opposing it by insisting on fantastically perfectionist schemes that they know are so impossible that they can never be a threat. I don't know what causes this apparent progress. I think it is many things, including the new generation of officers that do the thinking about this subject in the military services, themselves, and perhaps the higher degree of literacy demanded in the Pentagon as a result of Mr. McNamara.

But it is also about 8 years of progress since the time that Mr. McCloy was called in by President Kennedy to think once more whither the subject of arms control should go. It has gone so far that it seems to inform our defense planning in a way that is far more healthful than the notion that arms agreements necessarily are specific, formal treaties to be officially negotiated, ratified, and then allowed to become rigidly obsolete with no way of changing them.

Mr. ZABLOCKI. Thank you, Doctor. That is a very interesting statement. It poses some very good questions.

My time has expired, but let me say that I think there would be some one who would be highly critical of any discussion with the Soviets, almost looking upon such discussions as unpatriotic.

Further, you will find there is some question whether the Defense Department or the military have entered into the diplomatic field to too great an extent.

These are some of the questions we may have an opportunity to pursue later. But, my time has expired.

Governor Thomson.

Mr. THOMSON. Thank you, Mr. Chairman.

Dr. Schelling, I notice on page 5 of your statement you say you are more concerned that a decision on Sentinel or any system be taken wisely than that the decision be the correct one. I gather from your elaboration that you really think that this decision was wisely taken, and also that it was probably the correct one. Am I correct in that conclusion?

Dr. SCHELLING. Yes.

Mr. THOMSON. I would like to have someone, maybe Mr. Kahn, tell me about these offensive weapons.

You referred to MIRV and recently we have heard about the FOBS.

Would you describe for me what the difference is between FOBS and MIRV?

Mr. KAHN. Let me start with the MIRV. The term means "multiple independently guided reentry vehicle," and the concept is that one can have a large package, a reentry vehicle, if you will, which can spew out or expel anywhere, say, up to at least 10 has been published in the newspapers, independent little reentry vehicles in the missile, so that one can have, say, on the Polaris, shooting up one missile but 10 separate atom bombs come out, each one in its own reentry vehicle, each independently guided, and each hitting then 10 separate targets.

This means, for example, under the program that was disclosed a few months ago, the United States will go from having about 1,600 warheads on missiles ready to be fired, to 7,500. This means, in turn, that if the Russians have 1,000 missiles, which have been roughly advertised recently, you could allocate three, four, or five missiles per Russian missile and have what some people call first degree of first-strike capability.

It doesn't seem that this will be likely early in the game, because the guidance will be crude and you will have weight limitations. But the guidance will be improved over time. Exact statements about the guidance are classified, and I have gone about as far as you can go in public testimony.

The FOB system has been considered numerous times by the United States, and for various reasons rejected. The Russians have developed a system and are possibly procuring it. The term means "fractional orbital bombing system," and rather than launch a missile on a ballistic trajectory, you launch a missile into orbit, the low-altitude orbit. This is low enough to go underneath your radar screens. So it would get quite a distance into your system before you noticed it. Then you de-orbit it the same way we do with the Apollo and then you hit a strategic base with it.

It is a more or less ideal system against U.S. bomber bases which depend upon warning for evacuation or to take off. It is less useful against a missile system which depends upon dispersal and hardening for protection. So it is purely designed against the American alert bombing. Since we worry less about Soviet alert bombers, we have not procured a similar system.

Mr. THOMSON. Is it possible for the FOBS to come in on this country, we will say, from the south? We seem to assume that the other missiles will come from the north.

Mr. KAHN. No. Both the ballistic missiles and the FOBS can come from either north or south. It you come from the south, you decrease your accuracy slightly. How much, I suspect, is classified. For some systems this decrease in accuracy is important and in others it is not, depending on the target.

You also decrease your payload a little bit. Again, in some systems this would be important and in some it is not. So one needs 360° cover-

age, because one can approach from any side. The ballistic missile system is difficult to do east and west, but you can approach to it. On the FOBS you can approach from any direction.

Mr. THOMSON. Dr. Schelling, in your statement, on page 5, you raise an interesting point about our nuclear strategy versus Communist China. You are questioning the application of "assured destruction." How would you recommend the United States shape its strategic objectives toward China?

Dr. SCHELLING. The main thing I can do is identify two extremes that I think would be mistakes and suggest that somewhere in between there may be a useful strategy. I mentioned one extreme which I think is a mistake. That is the notion that in case of some kind of war with China, attempting to destroy people in China, or even to destroy major cities because of key people in those cities, or the key economic assets in those cities, would be at best merely cruel and at worst wholly inconsistent with any Asian or worldwide objectives we had that might have gotten us into war in the first place.

The other extreme that seems to me unlikely to be of any use, is to have a conventional explosive bombing attack in the hope that we could either cripple the Communist Chinese military machine or make the war so costly that it would become unendurable.

My impression is that the effectiveness of bombing with high explosives in North Vietnam translated into the vaster country and target system of China, with the much greater distances to fly over enemy territory, just suggests that that is very, very unpromising. As a result, I am inclined to think that the kind of strategic bombing war itself in any version might not prove effective. But if it were to be effective, I would imagine it would mean using nuclear weapons with extreme care, possibly in very large numbers, presumably with the greater accuracy you could get against a more primitive air defense system than we would expect in Eastern Europe, with the object, perhaps, that we would get negative score for civilians killed, that we want to minimize blast damage, fallout, provide civilian warning in advance, as one might have done in other wars where feasible.

Secondly, I suppose one wants to be very careful about the war aim. If it appears that we are attempting to destroy China as a society, I imagine nobody comes to terms. If it appears that we are trying to eradicate the Communist Government of China in the hope that a successor government will be politically capable of being more friendly toward the United States, we may find them unwilling to come to terms.

So we may have to be more careful about what our war aim is than in a purely retaliatory campaign of the kind we typically plan for the Soviet Union. I have even given serious thought to such notions as landing ground forces to occupy a bit of Chinese territory in order to have something with which to negotiate—perhaps a Chinese evacuation of India, or whatever other target country the war might have been about in the first place.

I don't find it easy to design a painless, costless, victorious campaign. On the other hand, I am impressed with Chinese prudence. I trust they won't put us in the position of having to conduct this kind of war. But if it does happen, I suppose then we may discover that we much

prefer B–52's to Polaris weapons. We much prefer very small weapons to very large weapons, if we have to use nuclear ones.

We may discover that we have to use nuclear weapons. If we do, there is no more nonproliferation treaty; there is no more test ban treaty; and the nuclear club, if it hasn't already, will then build rapidly, I think, not toward 10, but toward 100. So it is a deadly serious decision we are talking about.

As I quoted President Johnson, this is a Presidential decision of the highest order. But one has to consider nuclear weapons in connection with Communist China simply because, in a war with China, the issues would be even greater than they have been in Vietnam, and the futility of a high explosive, strategic bombing campaign would be even more manifest.

Mr. THOMSON. Mr. Kahn?

Mr. KAHN. I would like to express some disagreement with what Tom has just said. We have done a number of studies of United States-Chinese wars. They have not been done in such great depth that they represent a serious exception to Tom's earlier remark that there have been no studies. We have looked at it on and off for the last 3 years.

First, on the bombing issues, in the bombing of Vietnam we were attempting to prevent a fairly large country from sending about 100 tons of supplies down south a day. As a matter of fact we could have done, in my judgment, an order of magnitude better than we did with intelligent bombing. But it is a fairly hopeless task.

The issue in strategic bombing is always the demand versus the supply. It is interesting to me that it is largely misunderstood. The Chinese, I think, do not misunderstand this. They have learned in Korea that strategic bombing can work very well.

General Ridgway, in his book, illustrates his own understanding of the issue, and also illustrates the lack of understanding. He starts out by saying several times in the early part of the book that one cannot isolate the battle troops by strategic bombing, which is roughly a correct statement. Then he points out that the May–June offensive against China, the reason it worked, was because of strategic bombing; otherwise, it would not have been successful.

Then he points out that the subsequent operation of the Air Force, where it tried to win the war by itself, failed because there was no offensive accompanying it. Then he made the statement that you cannot isolate the battlefield.

A Chinese division in action against the Americans would probably need about 300 tons a day, or it collapses, as it did in the May–June offensive. If you are supplying them with 600 tons a day, it uses up 300 just sitting still, and could fight 1 day a month. If you force it to fight 2 days a month, it is then in trouble.

In any large war against China, or in any attempt at destructing communications within China, the problem is not to stop 100 tons a day from going south, but it is quite different. I would argue classical interdiction campaigns might be very effective, properly designed, to try to do things that could be done.

I will make a second comment. There are a number of pieces of Chinese territory which might be seized and held. It has become an

axiom of the United States not to get involved in a large land war in Asia. I would argue that the more important issue is not to get involved in any war, but if you happen to pick an area in the world to fight in, the plains of northern China are ideal for our systems. This is tank country in tank warfare.

In some real sense, historically, attacks from the north against China have been more successful than not, and nothing has changed since. The reason I mention this is not because I advocate this. I, with Tom, tend not to think of the Chinese threat as being so serious, as most Americans seem to think. I don't think they themselves are as mad or anything else as they appear to be. But it is important to let the Chinese know that we have tactics against them that are credible. They depend a great deal on their own self-deterrents.

I would like to support Tom and make it actually much stronger, that in any war against China, we should be meticulous in observing against civilian damage. The one thing you don't want to do is kill 100 million Chinese and decide later on there was no reason for doing it. No man has ever killed 100 million people before in the history of the world, and I don't think any American President wants to be the first one to do so.

This means you need weapons systems which can be surgical. I would think that in any war with China, you would start off with high-explosive attacks, and if you do not design these attacks properly, then, of course, they will be wasted, if you don't think about them.

If you think about them, then they will not be. Secondly, you probably wish to think in terms of conventional pressure on the Chinese. You wish to have nuclear systems against the Chinese, particularly if they use nuclear weapons. You want to make clear that it will be disastrous for them.

The first disaster is not the annihilation of the Chinese people, but of its government, its military systems, its communications, controls, supplies, and logistics. Here the MIRV comes in extremely efficiently.

One can now design relatively inexpensive strategic forces which are relatively surgical in this kind of operation. I don't mean by "surgical" that they do no damage to civilians. In a very large attack against China, it is difficult for me to imagine at least 1 million, 2 million, or 3 million Chinese not being killed, and that is a lot of people, any way you count it. But it is not 100 million. It is not 50 million. It is not 10 million. It is 1 million, 2 million, or 3 million.

If I were President of the United States, I would give the Department of Defense instructions to design attacks against the Chinese which kill less than 1 million people, how effective are they, 2 million, 3 millions, and see what the differences are.

It is extremely important to understand, however, that any United States-Chinese war is a war which, when the thing is over, will have a postmortem. People are going to ask, "What did you do, and why?"

I want to repeat the one thing we will not be able to live with in that postmortem is having killed 100 million or 200 million Chinese for relatively frivolous reasons.

Mr. ZABLOCKI. Mr. Fraser.

Mr. FRASER. Thank you, Mr. Chairman.

Dr. Schelling, would you have regarded, or did you regard the earlier decision on the deployment of the thin ABM as an error? I

am curious as to how you relate the present decision to the one which was made a year ago.

Dr. SCHELLING. To use Secretary McNamara's language, I thought it was a marginal decision and I marginally came out against, whereas, he came out marginally in favor. I was against it for two reasons.

First, I thought we were rushing into a system that would dignify a Chinese nuclear threat, that would make it look to the Japanese and others that we were far more afraid of the Chinese than we should be, and that this would interfere with what was Secretary Rusk's original notion, that we should try to be a little more casual about the Chinese bomb and what it meant, and how scared other countries should be of a nuclear Communist China.

I also suspected that the Sentinel system was primarily recommended and supported and justified by people who wanted a far bigger system, which I thought would have some of the arms races escalating effects that people have recently, I think with exaggeration, warned against.

By last week I had gotten concerned that a decision against any sort of system would be in response to a kind of screaming public pressure that I thought was out of all proportion to the cost of the system and the danger of an aggravated arms race. By last week I thought it had been communicated to the Soviet Union that a decision even to go ahead would not prejudice arms negotiations and could even be reversed if arms negotiations went in that direction.

I was still, I should say, not persuaded by Mr. Kahn's 40-minute or 1-hour talk which is supposed to leave three-quarters of any audience convinced. But I am also concerned that if we become afraid that the Minuteman system is vulnerable, we will end up spending more money on an enlarged Polaris system, or very expensive ways of either duplicating Minuteman or basing it in new ways.

Quite possibly it is one of the cheapest ways to keep the Minuteman system—a system that was essentially planned and decided on 8 years ago in President Kennedy's first term—to keep that system reasonably satisfactory for another 4 or 8 years. If this is properly articulated, it seems to me it constitutes part of the arms negotiations with the Russians, not a block to it.

It seems to me that President Nixon has called attention to what a defense of Minuteman would communicate to the Russians about our intent, and that he was conscious that it posed a very different kind of threat to them than an effort to degrade their own retaliatory system by defending our cities.

Therefore, the President converted what might have looked like a bypassing of arms negotiations, or destruction of arms negotiations, into reasonable communication about what the objective of arms negotiations should be.

Mr. FRASER. One of the reasons I wanted to ask you that question has to do with the process by which these decisions have been made. Both of you talked about the ways in which decisions have been made.

It is clear, it seems to me, that there are many in the Pentagon and elsewhere who have consistently and for a long time advocated the full-scale deployment of the ABM system. It seems to me fairly clear that McNamara's reversal represented a political compromise. This is my view, as I understood it, even though I think on the merits one could make a case for the decision for the thin system.

Now we have again, you see, the resurgent political arguments stimulated in part by the deployment of these sites in the backyards of some cities, leading to a regeneration of the concern and opposition which apparently has resulted in a further compromise, even though it may be sound on the merits.

It is the process by which these decisions are made which concerns me very deeply. In other words, there had to be developed enormous amounts of pressure or counterpressure against those who want to keep building this system. Now we see the United States going ahead with the construction of the manned bomber, which has been sort of held in suspense, in the R. & D. stage, I gather, for some years.

I guess what I am trying to say is that in part my concern about the ABM isn't so much the question of whether the President is right or wrong. There are many things to be said for the decision. But it is the whole process that we are caught up in, the process that is leading to these high levels of military spending.

How do we get a handle on this? The other thing about the ABM that has struck me is that it is an item which gives us a handle for debate. It has, within limits, predictable military, political, and economic consequences. It is an identifiable choice in a relative sense.

But how do we get at some of these other decisions that come from the Defense Department? This is one reason I am so deeply concerned about the ABM decision, because in a way it is symbolic of this much larger issue which is troubling a lot of people.

Dr. SCHELLING. I would like to be able to say that the system worked well because there were pressures, as you described, forcing the President into possibly an unwise decision on a great, big system and then, through the political process, counterpressures arose that led to a compromise.

I don't like that though, because I think the recent campaign against ballistic missile defenses was a kind of short-lived, not altogether convincing, replay of the civil defense debate of 8 years ago. People were looking for an issue. For some reason, the Vietnamese war didn't provide that issue and they jumped on ballistic missile defenses.

I can only wish that the opponents of ABM had been able to demand that the decision be taken casually, however it was taken. But you can't be a flaming advocate of casualness. If you are going to mobilize great political pressure, you can't do it on grounds that something doesn't deserve all that attention in the first place.

It is worth noticing that we do not spend as much now as we used to on the great intercontinental thermonuclear systems. In fact, we have exactly the system that John F. Kennedy presented to the Congress in March 1961. Strategic defense and offense together are not only smaller in proportion to the defense budget, but smaller in absolute amount than they were 4 or 5 years ago. Even if you allocate an appropriate part of the Pentagon overhead and an appropriate part of research and development, we are still dealing with what is less than one-fifth of the defense budget when we talk about the Polaris, Minuteman, B–52, the Sage system, ballistic defenses, and so forth.

If you worry about the defense budget, I would say military pay raises will cost more in the next half-dozen years, several times over this system. I favor increased military pay. That is why it is hard for me, although I consider myself an antimilitarist, to get enthusiastic

about slashing the defense budget when it means asking 2½ or 3 million young men, many of whom don't want to be in military service, to keep my taxes low because it looks cheap in the budget that way.

But if you want to keep the defense budget down, don't pay your troops. Cutting out ballistic missile defenses is small compared with that.

I also think it is worth noticing, and I believe this is correct, that the total amount of deliverable megatonnage has gone down, not up, in the last 7 or 8 years. Secretary McNamara was fond of quoting a figure about the number of alert warheads that could be delivered on the Soviet Union, and this was always shown to have gone up. But to a great extent, phasing out all the B–47's and a large fraction of the B–52's took away from us our freight carriers. We are down now to weapons systems that for the most part contain far less energy yield than we used to have ready to load aboard these huge aircraft. So, measured in terms of the total amount of fallout you could produce over the Soviet Union if you went to war today with everything you have, compared with, let us say, the day the first Polaris submarine was commissioned, I think we would be unloading less, not more.

Mr. ZABLOCKI. Do you wish Mr. Kahn to comment?

Mr. FRASER. Yes.

Mr. KAHN. I think the BMD issue has been the most critical of any defense issue I know of, going over the last 10 years. Every year there have been major reviews, major studies, with the top people spending a lot of time listening to them. I don't know how many thousands of feet, literally, of reports. It happens that I came out in 1962 for a thin defense and I published it in a book on escalation.

I thought the thin defense was the right way to go. They want it big, of course, because it is the nature of bureaucracy to want it big. To call this a political decision is correct in a sense. Under that critical decision was an iceberg of very detailed, rather well-reasoned people, each one representing an interest, that is true. I don't know of any other decision where that much thought has gone into it; none.

When I mentioned before that intellectual thinking has gone down in this country, I agree with Dr. Schelling that there has been progress in all kinds of ways, but on lots of specific issues we have just lost the arguments. I have found in the past that when a system has been under fire, there is generally a lot of data about. But when it has not been under fire, they do not know themselves what they are doing.

We will go into an area and we will find out what things cost and where the things are located, and the first thing the office always asks us is, "Can we have copies of your thinking?" because they don't have any.

This is not surprising. They just don't do their job, generally speaking. I would think what you need is more skillful and skeptical review of this program by Congress and others. But I think it has to be more skilled as well as skeptical. There is nothing like having to defend yourself before a skeptical, knowledgeable man.

Mr. FRASER. Thank you.

Mr. ZABLOCKI. Mr. Findley.

Mr. FINDLEY. Mr. Kahn, if I understood your comment correctly, you made a case for a shift over the course of years to defensive weapons as opposed to strike weapons. What happens to the credibility of our commitment to Western Europe as this progresses?

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Mr. KAHN. It goes on substantially. It goes up substantially. That is one of the reasons for the shift. One of the things that has always surprised me is how nations don't worry about commitments. The French had no war plans for rescuing the Poles or the Czechs; none. The Poles and Czechs did not worry about it. When it came about, they found to their surprise that the French did not deliver, except to watch Poland be taken over. That is all.

Many Europeans asked me "Would the Americans really suffer 100 million dead to rescue us?" and I say "Of course not. We both know that is not true." I say then that "By the way, we probably will risk 10 million."

It always comes as an incredible shock to the audience because they realize I am dead serious. They wouldn't do it for us. What kind of insane people do we have who would risk 10 million dead to keep up with their commitments? This is one of the most serious countries that has ever existed in the world. We might go for 10, if we played crazy numbers games.

Mr. FINDLEY. Do you think that is a state of mind of the United States presently?

Mr. KAHN. Yes. It is an incredibly serious country. If the Soviet Union launched a large nuclear attack on Europe in 1967, in my guess we would have launched a large nuclear attack on the Soviet Union. I don't think so in 1969, because previously the Soviet Union nuclear force was limited. You could talk about disarming the Soviet Union.

Mr. FINDLEY. Do I understand that you say in 1969 the likelihood of a response on our part to a Soviet massive nuclear attack on Europe would be greatly diminished as compared with 2 years ago?

Mr. KAHN. You would have a response, I am sure, but the response would be very different. In 1969 you do not have any capability to launch to disarm the Soviets. You have the balance of power. If you hit Soviet cities, they will hit U.S. cities. They will.

I don't believe any American President will make the decision to see 100 million Americans killed.

Mr. FINDLEY. I certainly agree with you. I am not at all sure that our President today or tomorrow would risk 10 million lives.

Mr. KAHN. You don't know how serious he is.

Mr. FINDLEY. Who knows? But the reason I raise this is this——

Mr. KAHN. I would like to state something else. Let's take the two extreme examples. Let's assume that you have the offense emphasis where each side has 2,000 missiles, hardened, dispersed, invulnerable, and this is more than sufficient to basically destroy the urban areas of both sides.

You intend, and this is now a little bit misleading, to think in terms of what we call spasm wars, wiping out everything. It is clear that if that is your only option, you will not use your nuclear forces to protect Europe.

It is true you can put awful punishment on the Russians, but you won't do it. They know it and you know it. Now, this leaves you other options. One can imagine measured attacks, to destroy three Russian cities for revenge, and they will destroy three American cities. Those games are not interesting to American Presidents. They could be forced into it, by a bizarre chain of circumstances.

But I would argue by and large we should try to stay out of that game. We shouldn't think of it as the normal method of defense.

Let's assume now that both sides have large defenses, extremely large defenses. It is true you can no longer threaten the Soviet Union now with a massive attack which destroys the whole country, but you can threaten them with an attack that creates great damage, greater damage than they suffered in World War II.

They can return the compliment. This is true, too. But now you are talking in conceivable numbers, conceivable things. You have a threat that is not completely incredible. It is not particularly credible, but the double negative is important; it is not incredible.

Second, you have a mobilization race. We are very good at mobilization. I would guess that in the mid-seventies we would put something like $500 billion a year into mobilization in such a circumstance. You will be shocked what you can buy with $500 billion a year. That is the average gross national product.

In some sense, that is our traditional reaction. You can buy a spare United States in about a year and a half, to give you a sense of what we are talking about. So a mobilization race is in our favor, not theirs.

I don't happen to worry about Presidents going maniacal but, nevertheless, if both sides have 2,000 missiles poised, ready to go on 30 seconds' notice, somehow it is hard for me to imagine that the rest of the century will pass without something happening. I find it difficult. Or the next 100 years. I will give myself 30 years.

It is a somewhat dangerous looking world. People find that comforting, they really do. I would find it much more comforting to have 100 missiles on a side and very heavy defenses on both sides, so if somebody presses several buttons by mistake, the result would be disastrous, but not totally cataclysmic. From the viewpoint of other nations and the arms control as a worldwide phenomenon, this seems to me absolutely the best system.

Again, I want to repeat: Missiles are cheap. It is hard for me to believe that you can prevent 50 or 100 nations eventually from getting into the missile business. This is the currency of international procedures.

I would not myself move to heavy cover. I wish to make this very clear. Unless you had an agreement with the Soviets to do this and to cut back offense at the same time, I would not proceed in that fashion, however.

I would find it a much more humane, a much more practical and in some ways a more efficient system, and much more consistent with U.S. responsibilities in the world.

Mr. FINDLEY. Wouldn't this require that Western European nations have their own ABM defenses?

Mr. KAHN. No.

Mr. FINDLEY. Do you think that is desirable?

Mr. KAHN. I happen to think that in the case of Western Europe they have two separate problems. It is actually easier to protect against close-in missiles. The technical problems are simple. But the problems against air are very hard. There are a lot of fighter bombers in the Soviet Union and it is very hard to do a reasonable protection of fighter bombers.

Secondly, the arms race aspects on missile defense are much less in Europe, so that is a plus on their side. But the strategic implication is also much less. It doesn't do as much good.

It would seem to me if the Europeans want to spend money on missile defense, I would not object to it, and if they wanted technological help from us, I would not object to that. But I would not see any reason why we should help finance it. If we do not help finance it, they will not build it, so the issue would settle itself.

Mr. FINDLEY. Thank you.

Mr. ZABLOCKI. Mr. Fulton.

Mr. FULTON. Actually, there is a person who starves to death every 9 seconds. To hear this sort of talk of aiming weapons at each other scares me. It sounds very unrealistic to me, and it sounds like a world divided into armed camps.

I have always been for a strong U.S. defense, and I have been in the service. But there is a different philosophic context that maybe we are missing; that is, that we should be for an open world, and that we should be the useful nation and the helpful nation.

In my opinion, then, they would find you so useful that they would never destroy you. If I were a Russian and heard what you people are saying here today, I don't know; I think I might go back and boost the budget.

The problem is this repetitive salient of history. I have a very good friend, a book reviewer on the Illustrated London News, who has written a review of a book on World War I, 1900 to 1914, by Mr. Charles Petrie, a famous British writer. He has delineated all this from the building of the armaments and the fact that it got down to two competing powers Germany and Britain, and the failure of alliances, to the assassinations period, then to the massacre period of the Armenians on the streets of Constantinople.

We are right back into it all over again. The world's problems multiply. Going through a series of events, for example, the Russians in the North Sea attacked the fishing vessels and mowed them down. We are getting that same thing all over again. The question is this: If we build this tremendous power structure, it seems possible to me it would all be built on sand. Can it be maintained in this kind of a world?

In my kind of world, it can't. For example, I would like more emphasis on the development of the peaceful uses of NATO. In the Space Committee, I want space for peaceful uses. Yet, if we take this other posture, we gradually come to this terror business, an equivalent of aiming a revolver at your neighbor's head every night, and then going to bed.

I come to a certain place where it doesn't fit for me. How do you fit this in with our foreign aid, where we in America are so generous to developing nations, and with the freedom of the seas, the freedom of the air, the exchange of people, and cultural exchange, when all of a sudden behind us we have this thing looming behind every city, behind every house, and over the head of every family? That is not a sympathetic approach; it is practical.

Do you think this pyramid you people are talking about can be sustained?

Mr. KAHN. It seems to me there are at least two levels of argumentation. If there was no technology, no technological changes, rapidly, and so on, I would argue that 95 percent or 90 percent, or 80, of the normal causes of war have disappeared in the world.

Mr. FULTON. Ninety-five percent of the normal cases of war?

Mr. KAHN. Yes.

Mr. FULTON. How about the abnormal ones?

Mr. KAHN. The abnormal ones are peculiar. You used to covet your neighbor's territory. You couldn't give Algeria back to France today. We would not accept Venezuela as a colony. There are no strategic points. There are no economic or vital interests the United States has.

So the usual cause of war, which was to grab territory, to grab manpower or grab materials, has really disappeared. To me, it is a very important observation indeed that we no longer covet our neighbor's wealth.

What are the causes of war that are left? Well, there are a number. It is always a mistake to underestimate the integrity and honesty of your opponent if he happens to have integrity and honesty.

As I understand the Presidium, they believe they can make this world into a garden spot, eliminate disease, supersitition, poverty, hardships of all kinds. It happens that someone is standing in the way, the United States of America.

Mr. FULTON. To me that is to the good.

Mr. KAHN. I happen to believe they will not eliminate these things. I think if they had their way, you would have a state you would find most unpleasant. I suspect you do not believe that if they had their way they would, in fact, achieve this happy state. That is their belief.

When a man believes he can do that, he is under some compulsion to achieve those objectives. If you think you can create what they say they can, you are under compulsion to achieve those objectives.

I have asked many Russians. They have asked me, "Why do you have NATO? Do you think we are ready to launch an attack at you?" I have said, "No, I do not believe you are." But I will ask, "If there was a Communist uprising in any country and it was absolutely essential that you intervene, would you intervene?" They will say, "Yes, of course." I said, "That is the reason for NATO."

He didn't ask the size of the uprising, whether it was 10 people or 10 million. They feel they would have an obligation to support the uprising.

Mr. FULTON. But the Russians historically, as a people, have been concerned to defend their homeland, mother Russia. When we threaten it with these missiles that will wipe out all their cities, they, in the name of defense, move out to protect it.

To me, one of the causes of war you are missing is the right of access. You see, my open world gives everybody the right of access. It doesn't shut them out.

Mr. KAHN. I would be delighted to see passports abolished, tariffs struck to zero, people allowed to move around, but I don't think my Soviet friends would be.

Mr. FULTON. That is where I disagree with them.

Mr. KAHN. They have problems in the Soviet Union. If they adopted a democratic form of government, they would fall apart. They would have nationalities that wish to go their own way and they can't. I know of very few Russians who feel they can have a parliamentary system there.

Mr. FULTON. What has that got to do with all this tremendous armament, with aiming guns at each other's heads and missiles? That is their system for economic development.

Then on top of it all you get us with our system and with this tremendous armament, and they, on a different system, aiming the armaments at each other. It doesn't make sense.

Mr. KAHN. The armaments are going down. We used to spend $15 billion a year on strategic warfare in the fifties, and now it is $8 billion. It may go to $10 billion on the missile system. So other things cost money in this country, things like the pay, and the general forces, which I would think could be reorganized in all kinds of ways, very frankly.

I happen to believe that the armaments burden would be a decreasing burden in this country in the future. It has been in the last 10 years. It has gone down, despite the war. In the midfifties, we spent 14 percent of our gross product and now we spend 9 percent.

Mr. FULTON. That isn't the burden. The military economic burden is less, but the terror is more.

Mr. KAHN. I would disagree with that, too, to be frank. I think Tom had a remarkably apt phrase. The purpose of these weapons is to encourage prudence. These are prudence-producing systems, and they work remarkably well in that respect. I happen to think that they don't work perfectly, and I prefer replacing them with nonterror weapons, with defense.

Mr. FULTON. I flew in especially to get here, because I wanted to hear this. If my neighbor has one revolver and I find it out, I think that I had better watch out for myself, so I get a revolver. But if I then find he has a cache of 10 weapons hidden behind the woodshed, does that encourage more prudence in me, or more fear?

Mr. KAHN. Can I tell an anecdote?

Mr. FULTON. If you want to avoid it.

Mr. KAHN. No, directly. I had a friend of mine who was an embezzler and 10 years ago I had a conversation with him. He made his living as an embezzler. He had been in jail twice. I met him again 10 years ago and he was under indictment for the third time.

I asked him, "Why do you do it? You are a two-time loser. You clearly don't know how to get away with it. Forget about morality for the second. It just doesn't seem to make sense."

He said, "I can't help it. People trust me." He doesn't have sufficient strength of character to withstand the kind of trust people have in him. He is a tremendously outgoing guy. To meet him is to trust him. He doesn't have enough character.

Mr. ZABLOCKI. My colleague, I am sure, is bringing out questions for the sake of getting your views. He certainly knows that the instant case you chose to mention should be remembered.

I don't think we should foreclose Dr. Schelling from commenting on your question.

Mr. FULTON. I didn't know he wanted to get into this same mire.

Mr. ZABLOCKI. You said that.

Dr. SCHELLING. I think we are in the mire. We have these weapons. There they are. Unlike Herman's embezzler friend, we are not trusted by the Russians; they are not trusted by us.

I think what we are discussing here, and it sounds either warlike or merely coolheaded according to whether we are talking with the Russians or merely against the Russians, I think we are talking about the question, if our neighbor has weapons because he doesn't trust us, and we think that he could be equally secure against us if he had a somewhat different kind of weapon, we will talk with him about it.

We might want to argue, "Don't have a single-shot 12-gage shotgun. Get yourself a .22 rifle, because if you shoot me with a .22 rifle, I can probably get off a few shots in return before I die. You know it. You won't shoot me. So I don't have to try to shoot you with my .22 rifle."

But if each of us has a 12-gage shotgun in range of each other, there is one sure way to be safe if you trust your aim, and that is to blow the other man's head off and do it in "self-defense."

Mr. FULTON. That scares me.

Dr. SCHELLING. That scares me, and that is what I am proposing to the Russians. Let's get rid of these shotguns. Let's get .22 rifles. We can still kill ourselves with .22 rifles, but we are less likely to. Let's see if we can design weapons that don't provide such an advantage in a crisis, in jumping the gun and going first.

Let's design weapons which, even in the case of what looks like war, allow you to sit still and make sure. Let's design weapons so that you don't need to have them go off automatically or by subordinate decision in case communications are cut off.

It matters, perhaps, less what the total ammunition supply is than what the motivation is for launching, or mistakenly thinking that the war is on and starting one.

Winston Churchill sounds awfully warlike if you read his World War II memoirs. He didn't like Germans. But his earlier book about World War I has an interesting passage. The Germans were building dreadnaughts and the British were building dreadnaughts. Every time the Germans increased the armor-piercing capability of their shells, the British increased the thickness and strength of the armor on the ships. Every time the Germans launched a ship, the British tried to launch one and a half.

Finally, Winston Churchill, when he read the newly announced naval construction program of the Germans in 1912, said "Why don't we tell them this makes no sense? They know if they build two more dreadnaughts than expected, we will build two or three or four more than we planned, to oppose them. Let's propose they do not build a few."

Well, they did send a member of the Cabinet to Berlin and proposed that, even without admitting they had cut their program, they could stretch it out over time, build one per year instead of one and a half per year, and then the British could simply stick with their plan, which was to match the Germans at something like a 1.5 ratio.

"You will save us money. You will save yourselves money. We will stop aggravating each other with an arms race and we will both look less menacing to the Belgians and everybody else."

The Germans were not interested. Now, my hunch is, 50 years later, when Secretary McNamara, or I hope Secretary Laird, proposes, let's talk to the Russians, not just about quantities and money,

but about the kind of weapons that would make us uneasy and the kind of weapons that would make them uneasy, we may get a response.

Let's see whether Sprint missiles to defend Minuteman look different to them from Sprint missiles to defend New York. Let's ask them whether they think defending Washington, D.C., is even in their interest as well as ours, because one thing they don't want ever to happen is to have civilian authority in the United States disappear.

So we are in a position now, I think, to talk with them. It may not come to direct talks. But the U.S. Government can try to speak intelligently and openly, perhaps, to people like yourself, in such a way that the Soviet Government can hear and understand and judge whether we are serious, and react accordingly.

If it does come to direct negotiations, then I would say the prospects now are better than they were in Berlin in 1912.

Mr. ZABLOCKI. Mr. Bingham.

Mr. BINGHAM. Thank you for allowing me the opportunity to ask a question since I am not a member of the subcommittee.

I must say I have found this one of the most fascinating mornings of my congressional career. At the same time, I feel a little bit as Mr. Fulton does, that the whole thing can be, in one way, summarized by the acronym for "Mutually Assured Destruction." It seems a little mad.

First, I would like to ask one specific question and then a little more involved question.

Why is not the Polaris system, as it might be developed, an adequate response to a first-strike effort? Why is it not an adequate deterrent? Why do we need protection of the Minuteman?

Mr. KAHN. In studies of the Polaris system, if you try to destroy something like the Polaris system in 15 minutes, it is very difficult and probably impossible unless we make a mistake. You can make mistakes. You can, for example, let them put a mine on every time it enters your harbor, which is timed. In other words, in any system you can get a little careless and be destroyed. So let's assume that doesn't happen.

If you want to destroy it over 3 months, you would have a very different kind of job. Well, let us assume the country is absolutely naked and they start hunting down Polaris submarines.

Mr. BINGHAM. By "naked" you mean no ballistic defense?

Mr. KAHN. That is right. What is your retaliation? Well, there are several things you could do. You might throw some missiles at their country and say "Stop it." Or they will throw missiles back and the whole thing looks kind of mad and I doubt that people like that particular idea.

You could threaten them, by trading weapons systems. We have a big thing back here anyway, Minuteman, which is also impressive. So you could say, "Even if you succeed in your campaign, you will have done nothing." That is the bizarre case.

Any single weapons system is likely to have characteristic weaknesses. In the case of the Polaris, the system is well enough designed so that weaknesses are not obvious to anybody, and are very persuasive. If this were a classified discussion, I could go through some of the things on the Polaris and say you cannot rule these things out, but they are not very persuasive.

Then I could point out something with you, that I haven't studied Polaris very hard because I have only a modest interest in it. Russia has studied it much harder than we have, or might. They might well find a system weakness in the system. It would fix everything kind of simultaneously.

I can give you a number of historic examples of this. For that reason, we have argued in this country very strongly that we would like to have a multiplicity of methods of assured destruction, so that the weakness in one will not be the weakness in the other.

I would like to make a third comment, if I could. I haven't agreed with your statement of MAD. Mutual assured destruction strikes me as mad. I agree. I wouldn't dismantle it without replacing it. Most Americans like world government, and I might like world government, too, but it seems to me unlikely to see it in 50 years. I think arms are here to stay.

Again, I would like to repeat my original remark of more emphasis on defense, less on offense. It would serve much of the purposes, and it wouldn't have this MAD associated with it. He really shouldn't be angry at ballistic missiles which cannot reach him.

One last comment: To the extent that we have an alliance policy, to the extent we are not attempting to tell the Europeans they don't have to have nuclear weapons because we will protect them, to the extent we tell the Japanese, to the extent we tell the Indians, the Polaris system is one of the least reassuring systems in the world. It doesn't have the capabilities to make those things credible.

Fortunately for us, they don't seem to worry about this, so this may be a specious argument. You will remember what I said about the Poles and Czechs not wondering about the French not coming to their aid.

Mr. BINGHAM. Would you like to comment?

Dr. SCHELLING. I agree with most of what Herman said except that I don't, as he does, believe in world government. I am afraid that world government simply means that every civil war is a world war and I would rather keep them compartmented.

The most serious arguments in favor of not relying on any single retaliatory system exclusively, Herman has already made. The Polaris also has the peculiarity that it spends most of its time away from your homeland, where you can't guard it as you might like to. My guess is if we had nothing but Polaris, we would learn to spend enough money on Polaris to make it cost as much as Minuteman and Polaris combined.

We would discover we couldn't afford to service submarines abroad. We couldn't afford to service them in American commercial ports. We might have to build special security bases. They would spend less time on station. That would be compensated by buying more boats.

We would discover that they had to be escorted. The risk that the Soviets would trail them when they left port would be so high that we would need protection for them, both as decoys and as more direct protection. We would be in the escort and decoy business.

We might even then discover that last week's astronauts had found some techniques of green light photography or infrared photography which made it possible to track undersea vessels. We might even

discover if the Russians got careful enough they could convert what is now an American lake, namely, the Atlantic Ocean, into a shared lake with submarine detecting equipment on the bottom, and pretty soon we would be so afraid of Polaris that we would be either spending more on it or going into the airplane business in order not to rely exclusively on a single system.

I also like the idea that two military services compete for the job of protecting us. They somewhat keep each other honest. I would guess, for example, that we would have been much slower to get Minuteman, and both we and the Russians would have been in greater danger with Atlas weapons, if the Navy hadn't come up with Polaris and said, "Polaris is not susceptible to sudden destruction in a surprise attack; therefore, it is both a superior retaliatory system and one that is consistent with stability, tranquility and arms control."

The Air Force had to convert to the Minuteman, acknowledging the philosophy of the Polaris system, and having the nearest ground-based equivalent to it that it could.

I think that is helpful. I would even guess that a crucial part of the deterrence is the lack of confidence that an attacker can have in the vulnerability of your system. Herman mentioned this. Back in the old days, some Rand people used to tell me that even though we had B–52's and B–47's, carrier-based aircraft and all kinds of things around, launching a sudden nuclear surprise attack on the entire American retaliatory force was perhaps somewhat less difficult than the Japanese attack on Pearl Harbor.

Therefore, President Eisenhower ought to be more concerned with the Russians that do their engineering calculations, updated from 1941, in terms of sophistication, to attack our retaliatory system.

I felt somewhat reassured that if the Soviet leaders could not operate slide rules, didn't have the time to read thick books, and particularly if there was at least one Soviet military service that could find fault with the calculations of another military service that wanted to go to war with his weapons, and if there had been at least one or two occasions when the generals or the scientists had made flat predictions that turned out wrong, I thought Mr. Khrushchev then, and his successors now, wouldn't believe anybody who said it looks complicated but it is really simple. I want it to keep looking complicated.

I would be willing, to put it simply, to turn in half of the Minutemen on a new airplane system. If it turned out that it cost more, but was no more truly threatening to the Russians, but it just plain complicated the engineering problem of destroying in a sudden, surprise attack, I would say that kind of diversity is good, both genuinely good in complicating the attack problem, the warning problem, and the surprise problem, and also psychologically good in making it less likely that a Soviet leader will ever be persuaded by anybody that a prudent thing is to launch a war.

Mr. Bingham. Mr. Chairman, that is only one question. May I ask another?

Mr. Fulton. Your position seems to be to try to make it more complicated and, therefore, require more effort on both sides to produce more waste with no economic good. I am surprised to hear an economics professor say such a thing.

Dr. Schelling. I would rather complicate cheaply. To give an example, one good reason for not locating all your weapons in the

same place is that they all get warning at the same time. If they are differentially located, then an attack that surprises one may give inadvertent warning to the other.

Therefore, you complicate it not necessarily by having more weaponry, by complicating your command and control or even by raising the expense. I am simply saying that presenting the enemy with a diversified, complicated-seeming target system is a worthwhile objective.

If it turns out it costs more or compromises your ability to control it, then I don't want it. But it is not, I believe, the case of having Polaris and Minuteman cost more than equivalent destructive capacity concentrated in one weapon; and, therefore, diversity has some advantages if it doesn't bring these other factors up.

Mr. FULTON. Thank you.

Mr. ZABLOCKI. The second bell has rung.

Mr. FULTON. We have 3 minutes.

Mr. ZABLOCKI. We couldn't ask the questions remaining. I wonder if the witnesses would agree to be back in 5 minutes and resume the hearing.

Dr. SCHELLING. Yes.

Mr. ZABLOCKI. The committee will take a brief recess.

(A short recess was taken.)

Mr. ZABLOCKI. The subcommittee will come to order. We will resume the hearing.

Mr. Bingham.

Mr. BINGHAM. Thank you, Mr. Chairman.

Mr. Kahn, I am very impressed with your logic and the way it proceeds, but I do find on page 5 of your argument for the BMD system, which is a different set of initials than everybody else's, you state what seems to me a basic assumption in your entire analysis, and that is the sentence, "I find it impossible to believe that the Soviets will not go ahead and deploy a ballistic missile defense system."

I am impressed with your analysis of how fast our scientific developments are moving. If we go ahead and deploy a ballistic missile defense system, it seems to me that we are absolutely assuring three things: that the Soviets will accelerate their defense system, that both of us will accelerate the development of the MIRV, of necessity, and that all of this will lead to greater fragility in the system and greater expense.

On the other hand, if we were to hold back now and pursue the R. & D., and try our best to get the Soviets not to pursue any further deployment of the BMD system—they have had one bad experience; they have deployed one system that was practically useless—maybe we could defer this whole escalation to the point where a totally new method of defense would appear. I am thinking in terms of the possibility of laser defense, as you suggest in your chart.

Wouldn't that kind of deferment of all of these developments be worth pursuing for many reasons?

Mr. KAHN. I don't know what my attitude would be if you could talk the Soviets out of deploying their system, But this is the only flat statement in the report, that I do not believe the Soviets will do it.

I think the Soviets would not say they had a bad experience with the launch. That is the American way of looking at it. They have deployed many air defenses which did not work in our judgment, and they seem to be delighted with them and redeployed them, There are about four or five different things going on here. The Soviets spend like four to one on the defense mission. We tend to spend four to one in the offense over the defense.

I think this reflects many things about the two countries. The Soviets are defense minded. They don't want to be naked. They think it is criminal to be naked.

I am going to Moscow in about 3 weeks and I will bet you not a single Russian man I speak to, who has spent most of his time in Russia, will use the arms race argument. It is just the exact opposite. Over and over again they say, "Our missiles cannot reach your territory. Why are you worried?"

I think they are right. I think the Russian theory of the war is better than the U.S. theory, so I will not argue with it. In particular, the Russians have problems we don't have. They do face China in a way we don't. They do face West Germany. And they face Japan in a way which we don't.

There is nothing in their system which argues that being naked to attack is a good thing. This is purely an American set of ideas which some Russians have picked up, but most Russians have not.

Khrushchev picked up a piece in his speech in 1961, when he said the Americans called this deterrent. He admitted the ICBM was. So, I would simply say that they are in the business of defense and they procure what is available. If better things come along later, fine. But they do not look with regret on the fact. It is the same as we don't look with regret upon prepaid fire insurance, when there has been no fire. There might have been a fire.

But the system might work, too.

I would also argue that while lasers do look interesting for the late 1970's and early 1980's, they don't look very interesting for the early mid-1970's, which is what we are talking about. And a 5-year period is a long period.

I would make another statement, that very likely the laser research will be accelerated. In other words, people take heart when they study positions. Most people working in this field earn larger sums of money working outside. They are very interested in working in these fields.

If the stuff is never deployed, they tend to lose enthusiasm. That is not a big argument either way. I just mention it in passing.

Let me make a final comment. I think it is very important for us to stop thinking of systems which will last out the end of the century. We want to be able to look at the last screw, but we ought to be able to think in terms of long terms, being comprehensive. When I do this, it is very difficult for me to imagine that even the United States would be willing to be naked in the world of the 1980's and maybe not even the 1970's, and it really is time for us to start thinking in terms of defense emphasis rather than offense.

Mr. BINGHAM. But isn't there something to be said on the time scale; that is, how fast you do these things? We try to persuade other countries to go slowly in increasing the sophistication of their weapons. Why shouldn't we try that with these weapons? You haven't touched on the acceleration of the MIRV.

Mr. KAHN. I think the MIRV decision was made by Secretary McNamara. I believe he was so much against the ballistic missile defense system, or the ABM, as we used to call it, that he overreacted to the Russian system to make sure there would be no argument. As a result of an overreaction, we have now programed 7,500 warheads. Those are presumably very inaccurate, but at some point they will get accurate.

Whether it is early or late, that is something else. At that point, there will be a partial strike capability against the Soviets, unless they, themselves, protect their missiles with a ballistic missile defense.

I suspect we will not reverse our MIRV program for all kinds of reasons, some good, and some bad. I think you are correct that the Soviets will increase MIRV, which they will do anyway.

The arguments go very high. No doubt there will be some small acceleration if we put a big system in, but not with a thin defense. It is just not that good a defense system. We weren't worried about that when we went to MIRV.

Mr. BINGHAM. Dr. Schelling?

Dr. SCHELLING. I will comment on only one part.

I think I disagree with Herman that for the rest of this century we should try to rely more on defensive systems than offensive systems. My disagreement, I think, is this: While defense systems put you in a mood of complete self-reliance, of conservatively exaggerating enemy strength and being prepared for it, and perhaps in deluding yourself if you spend enough and you are smart enough in your technology, and let the military have everything they ask for, somehow you will be safe; if you rely on offense, it means you learn how to live in a world in which, whether you like it or not, countries have great capacity to hurt each other.

Even if you go through occasional periods when that is not so, I think you have to learn to live as we do in our neighborhoods. My neighbor could kill me. I can kill him. I don't know why we don't kill each other, but I think it is because we got so used to the fact that punishment, if not swift and sure, was at least likely enough that even if you didn't like your neighbor you let him live.

I think it would be wise to learn to govern our relations even with adversaries in the expectation that usually, at least on and off, but perhaps usually and maybe always, very severe destruction can be done by either of us to the other. We must learn to govern our motives, our understandings and our relations, rather than to rely on our hardware.

While I am inclined sometimes to agree with Herman that we and the Russians should erect shields around us and then tell the Japanese, Germans, Swedes, and Indians that they are second rate in perpetuity because they can't afford shields, it might be wiser either to share some of their nakedness or at least not withdraw too much behind the shields.

For thinking about how to keep war from happening, being a bit naked, knowing that the Russians are a bit naked, and knowing that we have to get used to living in this kind of world, may be better than Herman's point of view.

Mr. BINGHAM. In view of your earlier statement at the opening, that each year we get through is to the good—I am impressed with

that—aren't you also interested in this matter of the pace at which these things move? Doesn't it disturb you that our deployment of an ABM is going to accelerate everything all along the line?

Dr. SCHELLING. It would if I thought it was going to. That is why a month ago I preferred that Sentinel not go forward. In and out of Government, it is now at least 7 years that I have been taking every opportunity to propose that one of the best places to experiment with the Soviets in arms control is abstaining from ballistic missile defenses, which in both countries will be costly, will lead to exaggerated claims of effectiveness, and would lead at least to enlarged offensive systems, and may aggravate opinion the way the civil defense system did a few years ago. That is why I thought we should do everything we could to indicate to the Russians we would be happy to abstain if they would, and that it would be rather hard to abstain if they didn't.

The question is, have I now changed my mind? Part of the answer is, I consider it now to be clear that nobody is going to slip over a $100 billion program on us just because he has a $6 billion foot in the door. I think it is also clear that the argument used by the President to justify this system does not lend itself to a thicker system. He has to find a new argument. In fact, he has to contradict what he said last week.

Therefore, a lot of the domestic escalation in this country may be more forestalled than if he had simply said let's delay the issue a year, let's not face the issue. I think, too, that possibly by protecting Minuteman we may have forestalled arguments that Minuteman is becoming obsolete or vulnerable. We may save ourselves more money in offense systems over the decade in Minuteman costs. Therefore, I feel that given the way the problem was posed to the President, given the attendant ideological debate, between those who want to race for superiority, and those who think that every way goes to escalation, I think the President has found a way to formulate the system so that it is even more safeguarded against escalation than the Sentinel was.

Mr. BINGHAM. Thank you, Mr. Chairman.

Mr. ZABLOCKI. You gentlemen have been most generous with your time, but we do have a few more questions.

Mr. KAHN. Could I make a quick comment?

Mr. ZABLOCKI. Certainly.

Mr. KAHN. I agree with Tom's analysis and, therefore, that we have talked about having 100 missiles which could inflict some millions of casualties. In other words, back to World War II. That struck me as a rather larger war and one which people were worried about. I think that is important, to have that concern, that you don't want to repeat. I think in terms of the French, we don't need them under either system. We just don't need them. We need them for political reasons, for moral reasons, for morale reasons, but not for economics, not for real estate, not for all of Europe, as far as I am concerned.

I think this is true of both systems. But the system of defense emphasis gives you the possibility of coming to their aid. The naked does not.

Mr. BINGHAM. Could you develop that thought a little bit?

Mr. KAHN. If the Russians have 2,000 missiles, which they may have in a couple of years, and we have 2,000 missiles, and the cities are absolutely naked, the missiles are invulnerable for one reason or

another, and your only tactic that you think of is in terms of what we call "spasm war." In launching a big attack, there is nothing for the United States to launch a big attack against Russia.

Mr. BINGHAM. What is the alternative?

Mr. KAHN. The defense effort is the alternative. In that case, the attack is like World War II.

Mr. BINGHAM. Does that mean including the defense missiles in Europe?

Mr. KAHN. No; this means defense of the United States and the defense of the Soviet Union, and it would cut down the offensive missiles.

Mr. BINGHAM. How is that a defense against France?

Mr. KAHN. It is not against France.

Mr. BINGHAM. For France?

Mr. KAHN. It is conceivable to people that the United States might incur 2, 3 or 4 million casualties to keep up with its obligations. I believe we would, to be frank. Neither I nor anybody else in the world believes that we would incur 100 million casualties to keep our obligations to anybody.

Dr. SCHELLING. I think the way he formulates the choice puts a lot on his side: we must be prepared deliberately, knowingly and all at once, to launch full-scale thermonuclear warfare with all the ammunition available, or instead to do the same thing with a defense system and reduce the consequences. If that is the choice I agree that the second system is better.

But it seems to me there are a lot more options. An obvious one is to reduce offensive forces instead, and spend the rest of the century trying to reduce offensive forces together with the Soviet Union, rather than merely negate each other the expensive way.

A very serious possibility is to design your weapons and your command and control so that even in case war breaks out you don't automatically just unload all your major weapons on any available civilian target. Not using ammunition ought to be one of the options that the President knows is available. I would just as soon spare Russians by not shooting at them than by doing my worst and letting them shoot my ammunition down.

The third and most reasonable way that you threaten the Russians, as they threaten us—the way they kept us out of Czechoslovakia, for example—is not that they would launch thermonuclear war as the first American jeep crossed the border; but in ways that can't be foreseen, through processes not wholly under control, something would happen, escalate and lead to bigger and bigger clashes, and some day somebody might fire off some nuclear weapons.

Lacking confidence that the Russians were scared stiff because they weren't protected, we didn't walk into Czechoslovakia last summer any more than we did in Hungary 10 years earlier.

The Russians would be out of their minds to think they could walk into France and not cause some kind of consternation that was fraught with danger for them. Therefore, you don't have to persuade the French that you are willing to lose 100 million or 10 million. I think the correct word is the word Herman originally used, but I think then forgot, that we might "risk" 10 million people, we might take a small chance of something that could blow up. We might not even know to avoid the risk if the Russians marched into France.

This does give the Russians pause, and it gives them pause whether or not they are naked to our attack and whether or not we are naked to their attack. This is what I would like people to get used to thinking about, rather than hoping for and then relying on a massive defense.

Mr. KAHN. I think it is very important for us to start thinking in terms of absolute complexities, rather than the sophistications I referred to earlier. I don't like the idea of just reducing offensive missiles because then your balance is very delicate. If it gets twice as good, you are in trouble, or if someone hides a few. I want to make the balance insensitive to violations.

So, I just can't get small forces. I have to have either big forces or big defenses in order to get stability. I would be for a big defense or a big offense for many reasons, among which sheer accident scares me. It is mad to have to point 12-gage shotguns at each other; .22's really are better. So, I really reject Tom's first alternative.

The second alternative is clearly correct if people are analytical. In other words, rather than go to many billions of dollars to negate 90 percent of the Soviet missiles, just shoot 10 percent and keep the other 90 percent behind you. Actually, people don't trust themselves to shoot 10 percent. They really believe that if one side shoots 10 and the other side shoots 10, that thing will jump.

I suspect they are wrong, by the way. I suspect Tom is right. I repeat, Tom is probably right.

On the other hand, it is good to reassure people ahead of time, to let them know how the system really works, and not be dependent on the good sense of that moment.

On the third one Tom is, I think, 100 percent right. In order to go back to my original points, I really have to go into more complicated engineering. I have to say yes; that no one is going to deliberately walk into this lion's den. The caution on both sides is unbelievable. There are very far reached threats that scare decisionmakers on both sides.

So then you get to something a little different. What happens if a situation arises which wasn't intended, where you don't have the choice but you have to compare processes? The standard case is uprising in East Germany. The West Germans intervene without orders. They don't want to, but it is hard to prevent that when the borders open up. The whole system is very shaky and either the East Germans or West Germans have to be slapped down in a very intolerable way. Neither side wants to do that. The thing sort of keeps moving.

Nobody is willing to take responsibility for Hungary. This kind of thing is tough when people have to stick their necks out. In that kind of situation, it could become incredible pressure against pressure, threat against threat, resolve against resolve, will against will. Here, again, it strikes me that the latent system is very poor for many reasons, which I will not take the time for.

I ought to add one small thing to what Tom said, Nuclear war is not a complicated subject. It is a little bit like calculus. If you have high school mathematics, you can learn calculus in about a day, or maybe two if you are a little slow.

Mr. FULTON. You can learn calculus in a day?

Mr. KAHN. Yes.

Mr. FULTON. It took me a year in college.

Mr. KAHN. But you had to learn many problems, to get a high level skill. I have taught people. That is not a loose remark. I have taught aviation cadets.

Mr. FULTON. You must remember that Congressmen are people and people make mistakes; so, therefore, Congress in a body often makes mistakes, too. So, we are on a different level.

Mr. KAHN. People will think calculus is a difficult subject, but it is not complicated. If you want to become an expert, it is 5 years. But just to get an understanding of what is going on would take about a day and a half or 2 days.

A nuclear war would take a day and a half or 2 days.

Mr. FULTON. A total nuclear war takes this long?

Mr. KAHN. No. To understand most of the important issues so that every time you raise the complexity of the argument a little bit you reverse answers. Tom and I are having a kind of debate and both of us know exactly what the other will say, and we escalate the debates and, in effect, the other day knew what I was going to say.

But you can get to a point where you can't reverse answers any more. In other words, your discussion is complex enough and you have looked at enough alternatives so that you can keep your position. I am not saying you get agreement necessarily, but you get stability in whatever your position is.

To have that kind of thing I would think takes something more than 20 minutes and something less than a week, that understanding of position.

Do your agree with that?

We are talking about Congressmen now.

Mr. FULTON. I disagree strongly because I don't think anyone understands these, professor or Congressman. To put a simplistic methodology on it so that it reduces it to factors and permutations and combinations really, to me, is missing the point that these are people we are dealing with. That is my point.

Mr. KAHN. But we are both talking about people. Nobody is assuming computers are rational people. It is very hard to be fired from Hudson but I would assume one way to get fired is to say that people are rational.

Mr. FULTON. It is a benefit to the world that the Russian people are in it. It is a benefit to the world that the American people are in it. We are each a part of the world. Therefore, it should be a benefit to each of us that we are both in it. We have been talking about the elimination of each other and why it is so terrible to have the other one. Couldn't we rather proceed on the obverse of this and say, "Well, if you wipe out one of our cities by mistake, we might give you a road program." It is at least a new idea.

Mr. KAHN. Yes. I don't think either Tom or I have made any comments against the Russian people, and I suspect both of us would be very upset if they were wiped out, to put it mildly.

Mr. FULTON. How do you escape this cold logic you are speaking of? When I take you out of cold logic by such an example, which, of course, would be a benefit to the relations of both nations, it gets lost.

Mr. KAHN. No. The Russians happen to be very short in housing. If you told them they would get a housing project for every American city they could destroy, I don't know what would happen. They have a tremendous housing shortage in Russia. It is very serious.

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Mr. FULTON. You are putting this cold logic of nuclear war and overkill for two peoples in such remorseless terms that it actually almost drives a person of commonsense to seek some way to escape this conclusion.

Mr. KAHN. I think it is unpleasant to face these problems. I think it is more unpleasant to talk about them. I don't particularly encourage discussion in the general public because I think this is the kind of thing which you don't want housewives discussing, to be frank.

It seems to me Congressmen should discuss it. It seems to me Government officials should discuss it. It seems to me people who are paid for the studies should discuss it. I happen to feel that it is very important not to take emotion out of life. That is what makes life worth living. I really don't like emotional discussions of issues which give rise to mistakes.

I used to make the comment to people who said they didn't like what they called icy rationality. I would say, "Do you prefer a warm human error, a nice emotional mistake?"

The answer is yes; people do.

But I don't think it is to be encouraged on issues this important. They are just too important for warm human errors.

Mr. FULTON. If you take the whole superstructure of nuclear war and reduce it to these simplistic terms of permutations, combinations and logic, then aren't you taking out of it most of the sum and substance of it, the human people? My belief is you can't do it that way because then it gets into a structure that is like having the two piers of the bridge working against each other, rather than with each other. You have taken the wrong postulate to begin with.

Mr. KAHN. I certainly agree that decisions that will be made by human beings, political human beings, typically, or organization human beings, is centrally important, to consider these individuals. I don't want to retreat from the point that in a couple of days I could teach you all you need to know about nuclear war. What I want to teach you is enough to enter the discussion as well as anybody else can. Every year we learn more, each year. But there is a lot known about these things. You may want to be more competent than us, and I would be delighted. If you want to be more complicated, I am 100 percent with you. Mainly, the discussions are simplistic. But I do not think you can get away with being much simpler, in the case of throwing out what has been brought into the discussion.

More complicated? Yes.

Simpler? I don't believe it.

Mr. FULTON. That is all.

Mr. ZABLOCKI. With some reluctance, of course, I leave the theory of human behavior discussion and come into some policy issues and questions which will have to be, in my opinion, very shortly decided.

We certainly would like to have the benefit of your thinking on three questions that I believe are very important. The questions and perhaps the answers will be more simple than the discussion we have had for the last 30 minutes.

From an area of the world where the discussion of the last few minutes has been placed—Europe—from there I would like to go to the Far East and Southeast Asia.

Mr. Kahn and Dr. Schelling, I would like to have you comment on this question: Okinawa is an issue that is emotional and yet important

for our national security interests, the reversion of Okinawa to Japan. As individuals who are familiar with that area of the world, would you give us your views on the strategic considerations involved?

Mr. KAHN. I think there are most important strategic and political considerations. I would guess that you could replace everything Okinawa does for you by an investment of some billions of dollars into Clark Field, the Philippines, and some other systems, deployment systems.

I think Congress would be very unfriendly to that, if it would take $5 billion to replace Okinawa. If you did that, there are people who would be angry.

Secondly, you don't want to be that dependent on the Philippines for various reasons. Clark Field is in itself shaky. You could also do things in Korea which would help replace it, but again would be expensive and has other disadvantages.

I made a recommendation in 1965 that we tell the Japanese that they will get the islands back in 1975 but we keep the base. They would have 10 years to pull the base away from the islands, into permanency, and in 1985 they get the base back. That would have been a generous offer in 1965, had the Japanese accepted. The Americans thought it was too generous. I talked to junior people in the State Department and they did not. The Pentagon people were against it. They had the vision of the year 2,000. Today I suspect you better get a time table and I would suspect something like 1975 and 1980. Tell them by 1975 they get the islands back, on jurisdiction, but we want the base, and by 1980 they get the base.

I would insist on keeping nuclear weapons on the islands for a number of reasons. This is a big sticky point in Japan, of course, but I think we are entitled to some concessions.

Dr. SCHELLING. I am delighted hearing him mention the last point. I don't think we have any choice. One can argue that we are being blackmailed by the Japanese if we don't allow reversion, but we are struck with the fact that this is now a political issue that can blow up everything we have with Japan, and everything we are interested in in Asia.

We are in the unhappy position that we are insisting on what looks to the world like the usual perquisites and accouterments that go with a military dictatorship on an island where the natives work for us.

Politically I think our situation there is untenable. The two main issues that presently concern the Japanese and the Okinawans are, may we keep nuclear weapons there, and may we conduct direct combat operations without prior consultation with the Japanese?

I think in both of these instances we shouldn't allow the Japanese Government to let us keep either of those rights. I don't think we would want any nuclear weapons on Okinawa. It is so important, I believe, that the Japanese people remain allergic to nuclear weapons that we shouldn't begin to let them get used to it by saying, "Well, those parts of Japan that weren't Japan when the weapons arrived there still aren't Japan and, therefore, we don't have them on your soil."

I believe there are many Japanese who want nuclear weapons kept in Okinawa after reversion for the very simple reason that they look forward to having a nuclear weapons program of their own and this

would be one of the easiest ways of getting people to be casual about nuclear weapons. I wouldn't allow them to become casual. It is hard for me to think of many uses for nuclear weapons in Asia in which the Okinawa base is essential to us. I would say it would be terribly important for a war with China if it weren't just too close, because if the Chinese are wondering what to do in retaliation if we ever used nuclear weapons on them, they were afraid to shoot Los Angeles, to shoot Tokyo, and for various reasons Okinawa provides them in very short range a purely military target attacking which, with a nuclear weapon, would appall us but would seem to be justified if we were flying nuclear missions off the island.

So, I doubt whether we want nuclear weapons on the island.

I also don't think we want the Japanese Government ever to be able to let us go it alone without their being responsible. Primarily, I have in mind the defense of Korea. I don't think we want to be in a position to defend Korea in ways that the Japanese Government can disassociate itself from. If they are not willing to take the position they support us and participate, I don't want us to be in the position where, because we can do it without their assent, they withhold their assent.

I would rather have prior consultation. It takes only 5 minutes for the Japanese Government to consult with us and agree, or, alternatively to display in 5 minutes they are not with us and were not willing to go.

I happen to think that the real problem is not going to be either of these. I think the real problem is going to be how to take care of an island, or some islands, with about three-quarters of a million people who absolutely depend for their livelihood on an American presence which they despise. They are in precisely the position of a colonialized people who dislike the Americans precisely because they are in the demeaning position of depending on us, not only for jobs on the bases, but for raising foodstuffs and being cleaning women, providing consumer goods and services to the Americans. They get about a quarter of their gross national product by working directly for either the American Government or American consumers. They know it. They are right now one of the poorest prefectures in all of Japan. They claim they are third from the bottom, I think. Without the jobs that we bring, they would be very measurably poorer than they are.

Immigration is about the only short-run solution—immigration to Japan, itself, presumably. They look forward to being a tourist industry, but that is not going to replace us. So, I think the problem is going to be that they wouldn't want us to leave. We will have an excuse to stay, conducting a lot of activities that aren't relating to the geography of Okinawa but merely related to the ease and comfort of doing these things in a place that is under complete military rule.

We will stick around. Our relations with the Okinawans for the next 10 years will poison our relations with the Japanese, and I don't see any easy way out. We have to allow reversion or at least a fixed time schedule for reversion, and I think it is in our interest to yield on those two constitutional points, about whether or not we have gone under the Japanese-American defense treaty rather than keep special nuclear privileges, but I am afraid that what we and maybe the Okinawans and Japanese haven't faced up to is that there is still a problem on Okinawa of American-Okinawan relations and it is not an easy one to solve.

Mr. KAHN. I suspect the economic problem would solve itself in about 5 years. The Japanese today are investing heavily in South Korea and Thailand for the "cheap" labor. Okinawans are Japanese. They have the same skills and disciplines. It takes time. They will not invest while we run the place. Japanese labor is tight enough now so that industry will go to the labor.

I can't imagine any Japanese base that doesn't have other problems.

I think Tom is absolutely correct; this is a fuse. Any instant it could explode, any minute. All kinds of problems could arise. You really want to defuse that thing. The only way to do it is to give a timetable rapidly. On the two issues, if I felt that this would have an impact on Japanese nuclear desires, I would agree with Tom 100 percent. I happen to believe that the Japanese are already moving very rapidly in the direction of nuclear weapons and I don't think this thing would affect them in the slightest.

But I think Tom is right, that the Japanese politician thinks it affects them. So in the Japanese judgment I think Tom is right, but not in my judgment of the Japanese. I think it makes things a little easier for them. I think it important that we not encourage this to nuclear arm Japan. I would not go out of the way to discourage it in the sense of a required position.

The reason I want to keep the option is I am really thinking of these attacks on studying. Okinawa may be worth a lot in all kinds of ways. Nothing is essential. Money will fix a lot of things. But if we have to spend a lot of money because the Japanese are not cooperative, my guess is Congress will get mad at the Japanese and the American people will get mad at the Japanese.

Dr. SCHELLING. May I interrupt?

I would agree that there are important possibilities of using Okinawa for nuclear operations. I don't believe there is any possibility of doing it against the opposition of the Japanese Government. If the Japanese Government doesn't oppose it, then we don't need the constitutional right to do it anyhow. We do it with their assent.

The only question is whether prior to the emergency in which we may want to use nuclear war weapons we want to stockpile nuclear weapons on Okinawa. The island still remains available to us for any operation in which the Japanese Government is to participate. My hunch is without their participation we win all the objectives but lose Japan in the process of fighting from Okinawa a nuclear war that they will be unwilling to engage in if they had a say.

Mr. KAHN. I am thinking of deterrents. I am thinking of nuclear systems on Okinawa which the Japanese recognize as being essential, which are surgical and, therefore, the Chinese should not use nuclear weapons first.

Mr. ZABLOCKI. Now for a final question.

In your opinion, gentlemen, would the recognition of China be in our national interest, and how would such a policy relate to the U.S. national security?

Mr. KAHN. If it came as part of a general settlement, sure. But you have a problem with Chiang Kai-shek and Taiwan, Formosa.

If you had a two-China solution, for example, in the United States, and a two-China solution elsewhere, and so on, I don't think it helps enormously. We are trying to seduce them. We are trying to give

them goodies. They are very clear that they don't want to be Russian revisionists. So they, themselves, I think, do not want much intercourse with us. They say ideology and production, but ideology before production. I think they are being honest.

The thing they fear more than anything else, some Chinese, is a kind of wavering of ideological fervor because of interaction with the West. I don't think we will do many favors with this recognition.

On the other hand, if you can formalize the situation, yes. If it is at the cost of "betraying Chiang Kai-shek and Taiwan," I think we may be in the business of betraying several people. We shouldn't get into the habit. Whether or not you like Taiwan, that is a separate issue. If the guy is our ward, to the extent that each is under our influence, to that extent you are obligated not to betray.

Mr. ZABLOCKI. Then you don't foresee any possibility of lowering the tensions between the United States and China even by trade agreements or other contacts and exchanges?

Mr. KAHN. There are a number of things we can do, I think, that will decrease the tensions. I think the basic structure of the situation is that the Chinese are the proudest people in the world, and the poorest. We are rich. They are afraid of revisionism. There is a deadly fear which causes revolutions and so forth. From their point of view, they need this attention badly. They want it and need it. I don't think anything we do can change the situation.

Mr. ZABLOCKI. Dr. Schelling?

Dr. SCHELLING. I can't be much more hopeful. I am not sure there would be a more friendly regime in China if the Communists had failed. They would be miserably poor. There is a great difficulty in pulling the people of the country together. They would be very resentful of us, no matter how much aid we tried to give them. They would be considering themselves part of the world's colored while we, by our standards, are white.

My main concern in dealing with the Chinese is to keep relations from getting a lot worse, and not to think that there is any solution to make them get better.

But, on recognition, it seems to me the problem is we can't find a form of recognition that the Peking government will accept.

I would be willing to betray Chiang Kai-shek to the point of saying, "We no longer recognize you as the government of China."

I would be willing to betray him by saying if there are two countries that used to be China, the bigger one sits as a permanent member of the Security Council.

I would not betray him to the point of militarily handing his island over to Peking. I would not want to betray him by withdrawing his ammunition supplies in the face of a Chinese attack.

I don't believe the government of Peking will let itself be recognized now as anything but the government of all of China. Therefore, we say, "We have no objection to legitimizing you by diplomatic recognition, as long as you will renounce the use of force to recover Taiwan, which we continue to call one of the Chinas." I think the answer is they do not go into the U.N. on that basis; they do not accept our recognition on that basis; they will not recognize us in return.

This is simply a subterfuge to get them to guarantee the security of what to them is the usurping regime on Taiwan. Until they are

prepared to acknowledge a separate Republic of Taiwan, and until the government on Taiwan is prepared to cooperate, we are stuck.

I think legally, technically, you can't recognize somebody unless he admits to be recognized, and I don't think they will admit to being recognized on any of the terms that have been proposed, and discussed.

Mr. KAHN. I would hate to subject them to the kind of things the British have been subjected to in being recognized. It doesn't look good to be kicked around so much.

Dr. SCHELLING. If they would come around to letting us have what is usually called a two-China policy, I would be eager to have it.

Mr. KAHN. A two-China without betrayal to Chiang Kai-shek.

Dr. SCHELLING. You are only betraying his claim to being still the ruler of all China.

Mr. KAHN. The smaller betrayals don't bother me. It is the bigger ones that bother me. We may be faced with some bigger ones.

I shouldn't be that quick. We shouldn't commit even this quarter betrayal without getting something for it. I am not saying that selfishly, without at least the world getting something for it. There ought to be real progress. It shouldn't be a fake.

Mr. ZABLOCKI. Mr. Fraser.

Mr. FRASER. Mr. Chairman, I had some questions but I don't think they are susceptible of answering in the time we have left.

Mr. ZABLOCKI. Would you like to ask as many as you have in the time available, or is it your intention to have them submit answers and have them made part of the record?

Mr. FRASER. Maybe I can indicate the nature of the questions and ask for a brief comment.

One of the things I have been perplexed with is how a conceptual framework can be developed with respect to the options that we have in our general military posture.

When I was talking about ABM earlier, I was talking about the fact that it seemed possible to identify choices and have some kind of public debate, however unsatisfactory. But in looking at the total of the military spending now and projected, the question of a manned bomber, the question of putting nuclear powerplants in more units of our fleet, the size of the force or manpower levels, I find it terribly difficult to get any kind of conceptual framework so one can begin to identify choices that can be talked about in the public domain, which would open up the opportunity for more intelligent decisionmaking.

I put that as a general concern of mine. I don't know if either of you, in a few minutes, can indicate approaches that you think are already known or are available so that this kind of intelligent debate could take place.

Dr. SCHELLING. I think what we need is quite a number of different conceptual frameworks, quite a number of different problems.

You mentioned the powerplants in vessels. It seems to me the only relation this has to broad strategic issues and diplomatic politics is that you may think of contingencies that are not usually thought of when one compared the economies of nuclear fuel versus oil, the problems of fueling at sea, the extra ships you need to be prepared to fuel at sea.

If you think of contingencies such as protracted operation in hostile waters in wartime, the aftermath of a war when oil is not available, and that sort, then maybe you come to conclusions in which the cost effectiveness evaluation of the two types of powerplants is impinged on by broader strategic questions.

But, on the whole, I think Mr. McNamara in his schoolteacher mood was pretty correct in proposing that if you can get two oil-powered boats for the price of one nuclear-powered boat you are better off unless somebody can show the special need for long-term survival at sea without tankers and tenders available.

On the question of military pay, I think there are a lot of questions of equity, of budgetary practice.

Mr. FRASER. I was thinking of force levels, the manpower levels.

Dr. SCHELLING. Of force levels?

It seems to me that there is no single conceptual framework that will tell you how many divisions we ought to keep in Korea or on Okinawa; no single conceptual framework that will tell you such things as to what it will look like to the French, Germans, and Russians, if you pull out one-third or alternatively two-thirds of the troops in Europe. These are quite different from issues like the ABM question, the things that have preoccupied your committee during these hearings.

I don't think there is any one single approach. It is not like Herman Kahn's calculus where once you grasp the fundamentals from then on you work in details with a single conceptual framework. When you go across the range of things from force levels and where they should be stationed, which takes in costs and turnover rates, and even force levels depend on what fraction of a man's time is spent in training—when you go from those to the big thermonuclear questions, the Chinese question and so forth, you get into so many big, different variegated subjects that I despair of any single idea, or any single one conceptual framework, being adequate.

When people write books and think they have encapsulated it in one new strategy with a grandiose name, I think that is just in the books.

Mr. KAHN. There is no question, I think, that most of the problems are simply not tractable to analysis. I make my living by analysis. All the interesting ones are tractable.

On the budget, I will leave that to the politicians. They get an answer, and they will always get an answer, and you can only admire them. I have no advice. Within any budget, I will advise on reallocations, but not advise you on the whole budget, by a factor of two or five. There are a number of issues which you can focus attention on to improve performance. Just asking questions does the trick. This can be destructive.

If you ask the French, "How do you support Poland and Czechoslovakia if Hitler attacks?" and they have no plan and can't work up a plan, then Poland and Czechoslovakia collapse before the attack. But, generally speaking, I think you want to ask those questions.

I bet you if you ask hard enough people will come up with answers, like they suddenly learn they didn't want to sit there, they wanted to attack Germany, and the world would be a lot better off. In other

words, if you had forced the French Army to come up with a defensive plan, everything would have been better.

You will remember that it took President Lincoln 3 years to find a general. At all points in the Civil War the North was stronger than the South, at all points. But General Lee made it different. Mr. Lincoln had General McClellan, who was not very good, and kept trying others, and went back to McClellan and finally developed three guys, Grant, Sherman, and Sheridan, and they won the war.

It is a question of: Is this guy any good? Does he know what he is doing?

To give you another example, in Korea, when MacArthur was pushed back, he told the Joint Chiefs and the President that he had to have Chinese intervention or nuclear weapons or bomb across the Yalu. He couldn't fight with one hand behind his back any more. That was a beaten army. My guess was if nothing had happened they would have been pushed out of Korea. But General Walker got killed in a jeep accident. General Ridgeway came there and in 2 weeks there was a victorious battle and in 2 months there was a victorious army.

I happen to believe, by the way, that you do a lot better with half the effort in a war of that type.

This is the most difficult thing in the world. Lincoln could tell the difference between a good and bad general. McClellan was the best general in the Union forces. But we know something much more important, that he wasn't a very good general, which Congress did not understand.

I would say that on a lot of these things you have to trust the President, trust him as little as possible. But it seems to me you are stuck with him. There is a lot more you can do by logic, obviously than is being done, and a lot more than can be done by skeptical questioning, because people will ignore the issue.

Mr. FRASER. The other approach that can be taken is to say flatly: Could $50 billion in defense expenditures give the United States a reasonable level of security?

Mr. KAHN. You can do a lot with $50 billion, a lot with $30 billion, and a lot with $100 billion. I have no advice on that subject. These are questions of probabilities, priorities, estimates, values. They are very difficult questions to even discuss intelligently, much less to analyze.

As I say, that is a political problem in the most extreme sense of the word. I have no idea on that.

Mr. ZABLOCKI. Are there any further questions?

Dr. Schelling and Mr. Kahn, you have provided a most interesting and informative session. We want to thank you sincerely. We deeply appreciate the generous time you have allotted to us. Thank you for coming. Thank you for your testimony.

The subcommittee is adjourned until tomorrow morning at 10 a.m.

(Whereupon, at 1:55 p.m., the subcommittee recessed, to reconvene at 10 a.m., Wednesday, March 19, 1969.)

STRATEGY AND SCIENCE: TOWARD A NATIONAL SECURITY POLICY FOR THE 1970'S

WEDNESDAY, MARCH 19, 1969

House of Representatives,
Committee on Foreign Affairs,
Subcommittee on National Security Policy
and Scientific Developments,
Washington, D.C.

The subcommittee met at 10:15 a.m. in room 2255, Rayburn House Office Building, Hon. Clement J. Zablocki (chairman of the subcommittee) presiding.

Mr. Zablocki. The subcommittee will please come to order.

Today is the fourth in a series of hearings of the Subcommittee on National Security Policy and Scientific Developments on the general subject of how space and weapons developments affect our alliances and security commitments abroad.

The session today is devoted to the consideration of U.S. alliance policy and security commitments as they may be affected by technological advances. To discuss this important subject, we have with us today two distinguished witnesses, Dr. Eugene Rostow and Mr. Mason Willrich.

Dr. Rostow served as Under Secretary of State for Political Affairs from 1966 to 1969, and currently is the Sterling professor of law and public affairs at Yale University. He has had an outstanding career as scholar, teacher, legal specialist, and public official.

Mr. Willrich is professor of law and director of the Center for the Study of Science, Technology, and Public Policy at the University of Virginia, formerly on the staff of the Arms Control and Disarmament Agency. He has written extensively on the problems of the nuclear age.

We are most pleased to have you with us, gentlemen.

Mr. Fulton. May I join in saying so, too? It is a real pleasure.

Mr. Zablocki. Dr. Rostow, please begin.

STATEMENT OF DR. EUGENE V. ROSTOW, STERLING PROFESSOR OF LAW AND PUBLIC AFFAIRS, YALE UNIVERSITY

Dr. Rostow. Thank you, Mr. Chairman.

I want to start with an apology. The text of the prepared statement that I gave to your staff yesterday omitted a page. Such things, of course, never happened while I was in the State Department. I will try to correct the error.

Mr. Zablocki. I understand, however, Doctor, that the page will not even be missed. The thought flows, despite the missing page.

Mr. ROSTOW. I appreciate what you say. But there was a certain concern, nonetheless, as I read over the text.

Mr. ZABLOCKI. That is only a compliment to your ability.

Dr. ROSTOW. The theme of these hearings, Mr. Chairman, is the pressure of technological change on our foreign policy. It is a fundamental theme, and one which deserves the careful and continuing attention of Congress and of public opinion.

The principal observations on the subject I can offer you, after more than 2 years in the State Department, is that technology is making the world smaller and more nightmarish with every passing day, and that the continuing risks of general war require us, more urgently than ever, to intensify our efforts to achieve a system of peace that could meet the standards of the United Nations Charter.

All the pressures of scientific progress are not threatening. While we meet today, for example, a conference on the future of Intelstat is taking place in Washington. The Soviet Union and other Communist nations are represented at that conference by observers. We can hope that in this important area the attractions of a great scientific advance will lead to the development of Intelstat as a universal body, engaged in the diffusion of knowledge, and committed to the improvement of understanding among the peoples of the world.

But before I comment on some of the implications of scientific and technological change for our foreign policy, I should like to propose a few preliminary thoughts on the shape and the future of our foreign policy, in the context of the debate on the subject which has absorbed the Nation for several years.

I believe it is not too much to say that the central battle in the struggle for peace is taking place in the American mind. In my view, the possibility of general peace for the next century turns on the outcome of that battle. And I should add today, 50 years after we repudiated President Wilson and the League of Nations, that the outcome is still in doubt. There is a considerable risk that we will try once again the blind and suicidal course of isolationism, which led to two tragic and unnecessary wars in this century, and the catastrophes which flowed from them.

For more than a century before 1914, we lived in a world of illusion so far as foreign policy is concerned. Our safety as a nation was protected by the British fleet. But we were largely unaware of that fact, and thought our security was a gift of nature, and of our virtue. Our self-deception about the problem of peace has had a decisive influence on our national outlook, and it has a far-reaching influence still. In large part, our debate about the country's role in world affairs is a struggle between the tenacious myth of our 19th century isolationism and the facts of life in the late 20th century.

The old system of order in the world, conducted by the nations of Europe, began to crumble in the years before 1914. It was irrevocably gone by 1945. Ever since the time of President Theodore Roosevelt, America has been uneasily aware of change in the framework of world politics.

We have debated these issues at intervals since 1918. One intense round concerned our membership in the League of Nations, and it influenced the election of 1920. Another turned on the threat of Hitler and his alliances to our security, 30 years ago. A third was addressed

to President Truman's policies in Europe and Asia. Last year witnessed an intensive and turbulent stage of this debate, directed to Vietnam, although its real subject matter was much broader than Vietnam. That stage of the debate reached its climax in the release of a national election.

With the election behind us, it should be possible again for men and women of differing views to examine these difficult problems dispassionately, and in an atmosphere of mutual respect. It is of great importance that we do so in every home and forum of the Nation, for we shall face hard choices in foreign policy in the months and years ahead. Manifestly, it is vital that the Nation's foreign policy have its source in an informed public opinion, and that it be understood, and supported, by the largest possible majority of the American people.

Against this background of history, it is discouraging to see the terms in which the issues are often debated still in the United States. There is wide division among the commentators about the major premise of our policy. In this realm, as in every attempt to apply reason to experience, the choice of a major premise is critical, perhaps even decisive.

Some contend that we do not need a foreign policy, and should not participate in world politics, but should devote all our energies to the struggle for social improvement at home. These men do not explain how we could avoid being engulfed in the troubles of the world, as we were in 1917 and 1941, should disorder spread; nor do they tell us who, in the modern world, could take over the responsibilities which Britain and France performed in the last century if we refuse to do so; nor, equally, do they indicate how our national interest in world order can be protected if we retreat to the foreign policy of President Harding.

Others agree that a return to the policy of isolationism would be dangerous to national security. But they do not agree what the main aim of our policy should be. One group of nonisolationists, finding it difficult to become enthusiastic over the idea of the balance of power, would have us engaged in the world not to support a general system of order, but only to uphold governments they could characterize as progressive, democratic, and forwardlooking.

The other school eschews any such aim as imperialistic. Our foreign policy, they say, should not seek to remake the world in the American image, but only to protect our basic national interests.

Members of both these schools are united at the moment in asserting that we are overcommitted, and that we must retreat. The first school mistakes the cause for the consequence of American involvement in world politics. Of course, our influence is on the side of progress, democracy, and social action wherever it can be felt. But we are not engaged in world affairs to help governments we happen to approve, but to further our own national interests in establishing and consolidating a system of peace.

As for the second school, the second group of critics of our foreign policy, they stress, and they stress heavily, that the United States in their view is overcommitted and must retreat. Their books and speeches are fuzzy, however, about how far we should retreat to avoid being overcommitted; nor do they offer us a clear criterion for deciding what commitments are excessive.

They all agree that we have a vital national interest in the continued independence and political integrity of Western Europe. But many

are dubious, even about sustaining our concerns for the future of the Middle East and the Mediterranean Basin, on the flank of Europe. And some would have us bring the troops back from Europe, the Mediterranean, and the Far East.

They take these positions without explaining how nuclear deterrence could be credible under such circumstances, and how we could preserve and protect nonnuclear options for dealing with situations of strain in the absence of a continued American presence in areas now guaranteed by American commitments.

In this form, it is difficult to distinguish their views from true, old-fashioned isolationism.

In a short book based on my experiences in government—"Law, Power and the Pursuit of Peace," University of Nebraska Press and Harper & Row, 1968—I have recently suggested that the major premise of our foreign policy is and should remain our national security interest in the development of a relatively stable system of power and order in the world—a new framework for world politics which could replace the system which disappeared in ruins in 1945.

Such an equilibrium, resting on the ideas of the Charter of the United Nations, should assure our own capacity to live as a free people in a world of wide horizons—a world of reasonable flexibility, hospitable to progress, but protected by the discipline of peace. This formulation follows closely that put forward by Senator Fulbright and other respected students of our national policy.

I don't always agree with Senator Fulbright about the conclusions to be drawn by applying this proposition to complex situations of international conflict. But, I can and do accept his statement of our national security interest in world affairs as a rational and realistic definition of our goal—a nonideological, nonimperialist, and perfectly manageable target for our political and military activities in a contracting world. I suggest that a test of this kind, and not any of the alternatives I have just discussed, should be the criterion for judging the success or failure of our foreign policy.

Many who accept this premise as a valid definition of our national interest and our national purpose would add that times have changed since the late 1940's when President Truman first laid down the broad lines of the foreign policy we have pursued ever since. The circumstances of world politics have, indeed, changed during the last 20 years.

But the critics of our foreign policy rarely point out in what respect those changes require a change in the policies and postulates which have developed since the late 1940's.

The Communist movements of the world are no longer as tightly controlled as they were. But the pressure of Communist ambition is still felt in the Middle East, Southeast Asia, and other parts of the world. Last year witnessed the invasion of Czechoslovakia, an event which closely parallels earlier contests over East Germany, Czechoslovakia, and Hungary. The steady increases in Soviet air, naval, and nuclear power; the development of the Chinese nuclear arsenal; and the emergence of Soviet and Chinese rivalry for leadership in world Communist movements—these trends hardly make the pressures easier for us and our allies to manage or contain. Of course the decentralization of Communist power offers our diplomacy certain opportunities, but it by no means guarantees their success.

I conclude, therefore, that if we are to safeguard our national interest in the achievement of general peace, we shall have to persist in very much the policy we have followed since 1947: that no radical withdrawals are possible, and no simple paths to security without tears. We can and should seek every opportunity to persuade China and the Soviet Union to accept the basic rule of live-and-let-live, of what they call détente and peaceful coexistence. But it is wishful thinking to pretend that they have already done so, and that the cold war has vanished.

Now let me turn to some of the implications of these changes for the structure of our alliances. That is the subject on which I was asked particularly to comment today.

I will start with a recent statement by President Johnson which I believe would be accepted also by President Nixon and by many of those who nominally disagree with the foreign policy the Government has been pursuing.

The maintenance of peace—

President Johnson wrote—

requires the continued knitting together of the three great power centers of the free world: Western Europe, Japan, and the United States. Here are the reservoirs of strength and skill on which our hopes for order and prosperity depend. If these three work together to deter aggression and to promote peaceful advance, I believe that sooner or later China and the Soviet Union will decide to accept our patient offers of peaceful cooperation. But if we fail to weld our present cooperation into a true coalition, the future will become dangerously uncertain.

The development of Soviet and American nuclear weapons during the last decade make it impossible to conceive of a radical weakening or loosening in the structure of our relationships with Europe and with Japan, and this conclusion is reinforced by the implications of the nonproliferation treaty.

On the side of the peaceful uses of advanced science, the pressure of cost is also a notable pressure in the same direction, that of consolidating rather than loosening alliance relationships.

During the course of my recent tour of duty in the State Department, a colleague and I had a conversation with a finance minister of an allied nation who suggested that what the world needs most is a trade union of finance ministers to suppress the ministers of science, that scientists, in short, were becoming intolerably expensive. There is a great deal of wisdom in our friend's remark. One can feel this pressure of costs in the structure of our alliance relations, in our relations with other countries, and indeed in the possibility of arms limitation agreements with the Soviet Union.

In space, in nuclear science, and in many other branches of advanced technology, we can see that despite national ambition and pride, and the strong desire for national and for regional science, there is a growing interest in cooperation with the United States for reasons of economy, first in the free world and then later on perhaps even between ourselves and the Soviet Union and other countries under Communist rule.

We cannot exclude the possibility that the pressure of cost will, in itself, provide an opportunity for consolidating both our alliance relations and ultimately finding a basis for cooperation with the Communist countries in this area.

So far as our alliance relations are concerned, our common interests, in economics and finance, trend in the same direction; that is, we and our allies share common interests in trade and monetary stability, and in education and the development of technology. They all point in this direction: that is, the direction of a policy based on the closest possible cooperation among Europe, Canada, the United States, Japan, Australia, and New Zealand and, in the longer run, India, Indonesia, and other like-minded countries as well.

There are, of course, other approaches in the air about the pattern and policies of the Atlantic alliance, and of our future relationships with the countries of the Pacific.

With regard to Europe, many alternatives have been suggested. Some Americans complain that Europe does too little, and that we should bring our troops home, forcing Europe to unite, and to take care of its own defense.

Some Europeans complain, in turn, about American dominance, or hegemony. They contend that since the defense of Europe depends ultimately upon American nuclear weapons, and since the United States, in their view, hardly favors the development of a European nuclear power, that is no reason for Europe to follow the politically difficult and unpopular course of increasing its conventional military effort.

It is almost equally difficult for Americans to understand the brutal logic of nuclear deterrence—that American nuclear power could hardly be expected to deter on a mail-order basis; that in an age of nuclear balance no one would wish to see the President of the United States or the rulers of the Soviet Union without any choices but the nuclear choice in the event of new turbulence in Europe or the Mediterranean and that American nuclear weapons abroad have to be protected by American troops.

The equally bleak fact is that hostilities in Eastern Europe could release forces whose outcome no man can control or predict. The United States has a profound national interest in the course of such events. It must, therefore, do everything in its power to prevent such occurrences, and to participate with its allies in policies to control them.

These are among the reasons why British Defense Minister Healey, and other Europeans, have sought confirmation from President Nixon that in this critical regard, American cooperation will remain firm. Thus, one by one, with reasons which are implicit in the situation, men find the alternatives to our present pattern of alliance relations unconvincing.

No European entity, whether of six nations or of 10, whether loose or tight, integrated or nonintegrated, Federal, confederal or even more loosely organized—no Europe, whatever its internal structure, could soon acquire the nuclear capacity to deter the massive Soviet nuclear arsenal, and to deter the pressures which emanate from that arsenal.

No one wants the formation of a Europe to weaken or destroy the unitary world economy which 20 years of patient work have built. Only transatlantic cooperation, therefore, and indeed more than transatlantic cooperation—transatlantic and transpacific cooperation—can solve our common problems of security, economics, technology, and education in the years ahead.

It is, therefore, most welcome and will be reassuring that on the basic issue of Atlantic relations, President Nixon's approach as stated in his Brussels speech of February 24 follows the policy line which President Johnson had outlined on October 7, 1966, and pursued throughout his administration.

We are left, then, so far as alliance policy is concerned, with the traditional prescription about making haste slowly. But that rule, sage as it is, does not and cannot mean immobility.

Our Atlantic institutions do need strengthening and they do need change. The nature of many problems requires reform: in the field of monetary policy, for example, where, in my judgment, existing patterns of cooperation should become institutionalized. Nothing less could concert and harmonize national policies and contain dangerous pressures toward protectionism and fragmentation.

Other steps are required in the political life of NATO to achieve equal responsibility in the relationship between Europe and America.

The procedures and the precedents exist if there is the will to use them. The allies have passed formal resolutions, most recently in December 1967, expressing their determination to consult each other intensively and at a high level in the process of making policy. It is time to put these resolutions to work, so that here, too, cooperation will become a matter of institutional strength.

Analysis leads me to similar conclusions about the structure of our interests and alliances in the Pacific. Until the threat of expansion subsides, I can see no easy way for us to escape from the dilemmas which history has thrust upon us. We should be in far worse trouble than we face today if the settlement in Vietnam threw doubt on the deterrent quality of American treaties, and if the Middle Eastern crisis is resolved for anything less than peace.

Let me conclude, Mr. Chairman, with a few tentative comments on the nature of the pressures which technological changes impose on these relationships. I propose to leave most such issues to our colloquy. But it might help if I identified a few of the tensions I have observed in this area.

First, there is the paradox of dependence. Politically, most of our allies would prefer having the capacity to take care of their own security. But they recognize that in the world in which we have no choice but to live, their ultimate reliance on the United States is stronger than it was 20 years ago, despite their recovery. This, of course, derives from the nuclear threat and will be heightened, in my judgment, by the ratification and going into effect of the nonproliferation treaty.

Second, this fact, the increased dependence of our allies on our nuclear power, leads to a second paradox, the presence abroad of large conventional American forces which are necessary—for the reasons I indicated a few moments ago—to protect nonnuclear options and to make credible the nuclear deterrent itself.

Large troop presences abroad impose a strain on the world financial system and lead, therefore, to relations of increased interdependence and increased complexity among the allies so far as the problem of dealing with balance-of-payments deficits arising from the presence abroad of American troops is concerned.

These pressures lead in turn to an increased dependence on American military and scientific supplies.

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In this period we have not yet achieved the simplicity and effectiveness of allied financial arrangements that we had during the war under lend-lease. But the problems are the same. The present position is paradoxical, in that financial factors tend to increase the dependence of our allies on our own military arsenal and our own military supplies.

Thank you, Mr. Chairman.

(The biography of Dr. Rostow follows:)

DR. EUGENE V. ROSTOW

Dr. Eugene V. Rostow, lawyer and economist, is Sterling Professor of Law and Public Affairs at Yale University Law School, a position he also held from 1964 to 1966. From 1966 through 1968, he was Under Secretary of State for Poltical Affairs.

Dr. Rostow was born in New York in 1913. He is the older brother of Dr. Walt Whitman Rostow, who was Special Assistant to President Johnson. At Yale University, Dr. Eugene Rostow received the B.A. degree in 1933, the LL.B. in 1937 and the M.A. in 1944. Cambridge University in England awarded him the degree of MA. in 1959 and LL.D in 1962.

In 1938, Dr. Rostow was admitted to the New York State bar. After practicing in New York City, he joined the Yale University Law School faculty in 1938. He became Professor of Law in 1944 and was Dean of of the Law School from 1955 through 1965. In 1966 he was Master of Trumbull College. He has taught or delivered lecture series at Cambridge University and a number of American universities.

From 1942 to 1944, Dr. Rostow was an advisor to the Department of State. He served with the United Nations Economic Commission for Europe in 1949 and 1950. He was a member of the Advisory Council for the Peace Corps in 1961 and a consultant to the Under Secretary of State from 1961 to 1966.

Dr. Rostow's writings include *A National Policy for the Oil Industry*, published in 1948: and *The Sovereign Prerogative; the Supreme Court and the Quest for Law*, published in 1962. He is joint editor of a legal case book entitled *Government Regulation of Business*, published in 1963. Dr. Rostow is a join author of *Perspectives on the Court*, which appeared in 1967. His writings on international order include an article in *Daedalus* in 1967 entitled "Thinking about the Future of International Society." *Law, Power and the Pursuit of Peace*, a revision of two 1966 lectures, was published last year.

Mr. ZABLOCKI. Thank you, Dr. Rostow.

Mr. Willrich.

STATEMENT OF MASON WILLRICH, PROFESSOR OF LAW, AND DIRECTOR, CENTER FOR THE STUDY OF SCIENCE, TECHNOLOGY, AND PUBLIC POLICY, UNIVERSITY OF VIRGINIA

Mr. WILLRICH. Mr. Chairman, I welcome the opportunity to appear before you today. I take it that the full text of my prepared remarks will be included in the record of the hearings.

Mr. ZABLOCKI. Yes.

Mr. WILLRICH. I plan to summarize from those prepared remarks.

Mr. ZABLOCKI. Very well.

I would like to add here that the witnesses will have an opportunity to revise and do some extensions if necessary on their testimony today.

Mr. WILLRICH. I understand you are interested primarily in my views concerning the ramifications for existing U.S. alliances and security commitments of the nonproliferation treaty, the United Nations Security Council resolution on security assurances, and nuclear-free zones.

Let me make clear at the outset that I support the nonproliferation treaty and believe its speedy ratification by the United States to be an essential step in the interests of our security and the security of our allies.

There are, in my judgment, two technological developments in the nuclear field which will have a continuing and growing influence on the conduct of U.S. foreign policy throughout the decade ahead. The first is ABM systems and the second is civil nuclear power.

The ABM problem is the subject of a great deal of current concern, debate, and some decision. I have expressed my views on this subject elsewhere. While I will be happy to discuss them with the members of the subcommittee, I wish to focus my oral remarks primarily on the security implications of civil nuclear power.

I have also discussed in my prepared statement the major implications for the United States of assurances or guarantees against nuclear attack and nuclear-free zones. I will summarize these briefly.

The ramifications of the development and growth of civil nuclear power programs for the security of the United States and the entire world community in the decade ahead are immense and, thus far, relatively unexplored. I do not believe these ramifications have yet been adequately considered either within the executive branch or the Congress as a whole. The issues and stakes involved are clearly not comprehended by the American people.

A reactor which produces electric power also produces large quantities of plutonium, a fissionable material which can be used in nuclear weapons. A small nuclear power reactor of about 200 megawatts-electric generating capacity produces every year more than 100 kilograms of plutonium, enough for five to 10 fission weapons.

Today, most nuclear powerplants being ordered in the United States are in the 800–1,200 megawatts-electric range. The U.S. Atomic Energy Commission presently forecasts that by 1980 the United States will have an installed nuclear power capacity of 120,000 to 180,000 megawatts-electric. It is currently estimated that by 1980 the United Kingdom, France, West Germany, and Japan will each have installed nuclear power capacities of roughly 20,000 megawatts-electric.

Other nations with substantial civil nuclear power programs are Canada, India, Italy, Spain, Sweden, and Switzerland. A much larger number of nations will bring into operation one to three small nuclear power reactors in the 1970's.

The magnitude of the security risk from the spread of plutonium and plutonium production technology throughout the world should not be underestimated. One recent and conservative estimate is that 8,000 kilograms of plutonium will be produced annually in civil nuclear power reactors by 1970 and 50,000 to 70,000 kilograms annually by 1980.

The corresponding amounts of plutonium accumulated in the world as a result of past production is estimated to be 28,000 kilograms by 1970, and 300,000 to 450,000 kilograms by 1980. Thus, the stockpiles of plutonium used in civil nuclear programs will soon dwarf the amounts of fissionable materials in the nuclear weapons stockpiles of the nuclear weapon nations. Yet, less than 10 kilograms of plutonium is needed for a bomb which will destroy a medium-sized city.

There are strong economic and political incentives to achieve this breakthrough. Research and development work on the gas centrifuge process for separation of uranium isotopes is already well advanced in several nations, including the United Kingdom, West Germany and the Netherlands on a cooperative basis, and Japan. The security implications of the successful development of this technology will be profound.

Uranium enrichment is the most direct route to nuclear weapons. Moreover, highly enriched uranium is a fissionable material which is strongly preferred as the trigger for a fusion weapon.

A gas centrifuge plant would be substantially less costly and somewhat easier to conceal than a gaseous diffusion plant which is the existing type of plant for uranium enrichment.

The nonproliferation treaty would have two effects on the development of civil nuclear power programs in non-nuclear-weapon nations. Article III would require all non-nuclear-weapon parties to accept international safeguards on all their peaceful nuclear activities. Article IV, although ambiguous and susceptible of a variety of interpretations, would in general commit those parties to the treaty which have nuclear capabilities—peaceful as well as warlike—to assist the further development of civil nuclear power, "especially in the territories of non-nuclear-weapon states party to the treaty * * *."

In essence, the nonproliferation treaty reaffirms and reinforces long-standing U.S. policy which began with President Eisenhower's atoms for peace proposals in 1953.

Without doubt, nuclear fuel offers large potential benefits in the generation of electric power at a lower cost in certain areas of the world when compared with the costs of alternative fossil fuels. Nuclear fuel also offers increasingly important advantages in terms of environmental effects—much less air pollution, although somewhat more thermal pollution of cooling water than coal or oil.

But what are the security costs—to the United States and to the world community—of the growth of civil nuclear programs in non-nuclear-weapon nations? Have the adverse implications of civil nuclear power which are apparent and immense been taken fully into account?

The answer given to these questions is that the international security costs of civil nuclear power programs have been largely offset by the policy objective that civil nuclear power programs in non-nuclear-weapon nations should be made subject to international safeguards. This is the objective of article III of the nonproliferation treaty.

Thus, the ramifications for United States and international security of the production and accumulation of very large amounts of fissionable materials in non-nuclear-weapon nations will depend on what safeguards are and how they will affect the situation. It is indisputable that without external control on civil nuclear power programs, especially in non-nuclear-weapon nations, that the availability of fissionable materials will in the near future create a major and widespread threat to international security and stability.

Safeguards consist merely of a system of international accountability applied to the nuclear materials used, produced, and processed in a peaceful nuclear activity located in a state. No system of safeguards will be able to account for every gram of fissionable material used in

a nuclear power program. In the process of establishing accountability standards, the developments of parameters may be a technnical task, but the choice of standards within those parameters will be political.

Disparities among nations in the amounts of plutonium accumulated in their peaceful nuclear power programs are likely to increase over time. As the gaps widen, the interests in international safeguards of nations with very large nuclear power programs, such as West Germany and Japan, are likely to diverge increasingly from those nations with smaller programs. Nations with small nuclear power programs, especially those without chemical processing plants of their own, are likely to view a safeguard system that is merely maintained at its initial level of effectiveness as a security assurance that diminishes over time.

How will nations respond if diversion of fissionable materials from a civil power to a nuclear weapons program is suspected? It is highly unlikely that an international inspector will ever be an eyewitness to, or receive direct evidence of a diversion. The most that can be expected from safeguards is indirect evidence—an ambiguous discrepancy in the suspect nation's materials balance system, or procedural roadblocks put in the way of international inspection of a particular nuclear facility at a certain time.

It is doubtful that any nation would embark on a secret nuclear weapons program unless, upon discovery, it was prepared to continue. Thus, the course of action of any suspect nation would be fixed, while action by other nations to stop the weapons acquisition process would be difficult to launch.

Those nations which would call the loudest for intervention in the suspect nation would be those which believe themselves to be immediately threatened. But these nations probably would be unable to execute the sanctions required without starting a dangerous local war which they might lose.

The burden of effective action will probably fall, therefore, upon one or the other of the two super powers, the United States and the Soviet Union. Yet, resort to the threat or use of force by either the United States or the Soviet Union in order to deny a sixth nation a nuclear weapons capability would in my judgment, place the super powers in a morally untenable position in the eyes of the world community.

How much reliance will nations place on safeguards in the final analysis? The governments of most nations have not yet faced this question squarely. The result thus far may be some misplaced confidence.

Will safeguards, as is frequently claimed, be a reliable assurance that fissionable materials accumulated in nuclear power programs are not used in nuclear weapons? Or will safeguards merely provide a reasonably accurate measure of the security threats implicit in civil nuclear power programs?

Are safeguards more analogous to verification that nuclear disarmament measures are carried out, or to observation satellites which count the number of nuclear missiles deployed by the nuclear weapon states?

A system of international accountability and inspection is clearly only part of an adequate response to the challenge to the international system presented by the growth and spread of civil nuclear power. Sus-

pension of the flow of materials and the provision of enrichment, fuel fabrication or reprocessing services obtained abroad is perhaps the key step in an effective sanctioning process.

But such a sanction would be without effect unless the suspect nation was dependent on foreign sources of supply. Thus, the advantages from the overall international security point of view of interdependence of civil nuclear power programs are clear, but considerations of national security and security of energy supply cut in the opposite direction.

Any movement in the direction of effective sanctions would require that the strong forces of economic nationalism operating in the civil nuclear power field be reversed in the very near future. Such a reversal will not occur unless there is a clear awareness at the highest political levels of the security risks involved. These risks will affect our allies more than us.

Coming to grips with this difficult problem will cause dissension, especially in the U.S. relations with its principal allies in which civil nuclear power is really taking hold.

To postpone dealing with the problem, however, is to lose the opportunity forever. If we do not develop with our allies and the world community at large a clear view of the nature of the security problem associated with the growth of civil nuclear power, and especially if we are lulled by the idea of safeguards into thinking the problem has been solved, exploitation of atoms for peace in one nation could well be viewed by others as the creation of a major threat to their security.

Now let me turn to the resolution of the United Nations Security Council adopted on June 19, 1968, outside the framework of the nonproliferation treaty but intended to provide nonnuclear weapon nations which become parties to the treaty with assurance against nuclear attack.

Will it follow from this Security Council resolution that, as declared by the three proponents, any state which commits or threatens nuclear aggression "must be aware that its actions are to be countered effectively * * *"? Does such Security Council action constitute a reliable nuclear security "umbrella" over the non-nuclear-weapon nations which become parties to the nonproliferation treaty?

A major weakness of the Security Council assurances resolution is that the events which will bring it into operation are "aggression" or "the threat of aggression" with nuclear weapons against a non-nuclear-weapon state. Thus, the resolution rests on the well-known and unresolved problems of defining aggression and identifying the aggressor.

Determination of the threshold question whether "aggression with nuclear weapons" has occurred in a particular case will be by the usual Security Council voting procedures on matters of substance, including the veto of any one of the five permanent members. Any action "through" the Security Council under the assurances resolution will require the support or acquiescence of not only the three sponsoring nuclear-weapon states, the United States, Soviet Union, and United Kingdom, but also the other two permanent members of the Security Council, France and Nationalist China.

Since Nationalist China is both a non-nuclear-weapon state and a prime target for nuclear threats from Communist China, it would probably support action under the security assurances resolution.

It is not so clear where France's interests will lie in concrete cases. But the resolution gives France, which has refused to sign the nonproliferation treaty, a large influence over the operational effectiveness of the security assurances which many non-nuclear-weapon states view as a vital, if not integral, aspect of that treaty.

The security assurances resolution also reaffirms the right of individual or collective self-defense under article 51 of the United Nations Charter. This reaffirmation may be viewed as serving two main purposes.

First, it negates any suggestion, which might be inferred from the pledges by the three nuclear-weapon parties to the treaty to seek action through the Council, that they had delegated in their statements of intention any veto-free power to the Security Council.

Second, reaffirmation of the rights of individual and collective self-defense provides a fallback assurance to the non-nuclear-weapon states if assistance from or through the Security Council is not forthcoming. It recognizes nuclear security guarantees which already exist in collective security agreements with the respective allies of the United States and the Soviet Union, without adding to or detracting from them.

Moreover, if the United States and the Soviet Union were in agreement, neither the veto of any other Security Council permanent member nor the absence of sufficient time for Security Council action could block coordinated superpower action outside the Security Council on the basis of the right of collective self-defense.

What, in practice, might the security assurances resolution accomplish?

We have been told by both the Johnson and Nixon administrations that resolution does not create any additional responsibilities for the United States, and yet it has been claimed that it is "politically of very considerable importance" that three of the permanent members of the Security Council have made it clear that nuclear aggression fell squarely within the primary responsibility of the Security Council.

The veto which each permanent member possesses limits the probable target of Security Council action to China, and no other potential nuclear aggressor. In this respect, the Security Council may become a principal organ for future collaboration between the United States and the Soviet Union in the containment of China—as long as China is not a member of the United Nations.

China sees the nonproliferation treaty as just such collusion between the superpowers. United States-Soviet Union collaboration in this respect will be a mixed blessing. It could, in particular, limit the possibilities for future accommodation between the United States and China.

Nevertheless, such open and institutionalized cooperation between the two superpowers seems an important ingredient of any meaningful security assurance to nonalined, non-nuclear-weapon states such as India. It is ironic, indeed, in this respect, that India, which was originally intended as the primary beneficiary of the Security Council resolution, has declared its intention not to become a party to the nonproliferation treaty. Thus, India has apparently decided that whatever security benefits there are in the resolution are not worth the price of joining the treaty.

Finally, a word about nuclear-free zones. In my judgment, this is not a very important issue because the prospects for the early entry into force of the Treaty of Tlatelolco, which would establish a nuclear-free zone in Latin America, are not very promising. A number of proposals have been advanced for nuclear-free zones in the past in a variety of areas.

Preliminary steps have been taken by the Organization of African Unity to establish a nuclear-free zone in Black Africa. The Soviet bloc has for years urged the creation of a nuclear-free zone in Central Europe, which, if implemented, would result in the removal of U.S. nuclear forces from West Germany. As might be expected, all such proposals have been given short shrift in NATO thus far.

How does a nuclear-free zone differ from the obligations which the nonproliferation treaty would impose on non-nuclear-weapon parties? There are three major differences.

First, a nuclear weapon state would be prohibited under a nuclear-free zone from deploying nuclear weapons within the zone, even though ownership and control were retained by the nuclear-weapon state. This is the main reason why until the Latin American nuclear-free zones came into existence, that those zones which were proposed by the Soviet Union were mainly propaganda overtures to procure withdrawal of U.S. nuclear deployments from our allies.

Thus, the Treaty of Tlatelolco would prohibit the signatories from accepting the deployment on their territories of nuclear weapons by any nuclear-weapon state. With the Treaty of Tlatelolco, however, the United States has indicated its understanding that it would continue to retain the right to transport nuclear weapons through the nuclear-free zone, and in particular through the Panama Canal.

Second, in a nuclear-free zone as contemplated by the Treaty of Tlatelolco, there is provision made for inspection if clandestine nuclear activities are suspected within the zone. Under the nonproliferation treaty safeguards are applicable only to declared peaceful nuclear activities in a non-nuclear-weapon party.

The third difference pertains to the undertakings of the nuclear-weapon states to respect the zone. The United States has signed, but not yet ratified, Protocol II of the Treaty of Tlatelolco which contains an undertaking "not to use or threaten to use nuclear weapons against the Contracting Parties * * *." In signing the protocol, the United States made a statement narrowing the scope of its commitment not to use nuclear weapons to circumstances where no other nuclear-weapon state is involved. Nevertheless, this is the first time a U.S. Government has agreed to accept any legal restriction on its right to use nuclear weapons other than the general restraints on the use of force contained in the United Nations Charter.

Of course, the Senate will probably not act upon the protocol until the future prospects for putting the Latin American nuclear-free zone into effect become considerably brighter. Thus, the issue does not seem to have much urgency at present.

Thank you, Mr. Chairman.

(The prepared statement of Professor Willrich follows:)

PREPARED TESTIMONY OF MASON WILLRICH, PROFESSOR OF LAW AND DIRECTOR, CENTER FOR THE STUDY OF SCIENCE, TECHNOLOGY, AND PUBLIC POLICY, UNIVERSITY OF VIRGINIA, MARCH 19, 1969

Mr. Chairman, I welcome the opportunity to appear before you today and to present my views on certain problems related to the effects of space and weapons developments on United States alliances and security commitments. I understand you are interested primarily in my views concerning the ramifications for existing United States alliances and security commitments of the Non-Proliferation Treaty, the United Nations Security Council resolution on security assurances and nuclear free zones. Let me make clear at the outset that I support the Non-Proliferation Treaty and believe its speedy ratification by the United States to be an essential step in the interests of our security and the security of our allies.[1]

There are, in my judgment, two technological developments in the nuclear field which will have a continuing and growing influence on the conduct of United States foreign policy throughout the decade ahead. The first is ABM systems and the second is civil nuclear power. The ABM problem is the subject of a great deal of current concern, debate and some decision. I have expressed my views on this subject elsewhere.[2] While I will be happy to discuss them with the members of the Subcommittee, I wish to focus my prepared remarks primarily on the security implications of civil nuclear power. I will also discuss the major implications for the United States of assurances or guarantees against nuclear attack and nuclear free zones.

I

The ramifications of the development and growth of civil nuclear power programs for the security of the United States and the entire world community in the decade ahead are immense and thus far relatively unexplored. I do not believe these ramifications have yet been adequately considered either within the Executive Branch or the Congress as a whole. The issues and stakes involved are clearly not comprehended by the American people.

A reactor which produces electric power also produces large quantities of plutonium, a fissionable material which can be used in nuclear weapons. A small nuclear power reactor of about 200 MWe electric generating capacity produces every year more than 100 kilograms of plutonium, enough for 5–10 fission weapons. The major economies in the use of nuclear fuel to generate electric power are economies of scale, and, accordingly, the trend has been toward building larger and larger nuclear power reactors. For example, today most nuclear plants being ordered in the United States are in the 800–1200 MWe range. The U.S. Atomic Energy Commission presently forecasts that by 1980 the United States will have an installed nuclear power capacity of 120,000–180,000 MWe. It is currently estimated that by 1980 the United Kingdom, France, West Germany and Japan will each have installed nuclear power capacities of roughly 20,000 MWe. Other nations with substantial civil nuclear power programs are Canada, India, Italy, Spain, Sweden and Switzerland. A much larger number of nations will bring into operation 1–3 small nuclear power reactors in the 1970's, including, for example, such diverse nations as Argentina, Israel, Pakistan and South Africa.

The magnitude of the security risk from the spread of plutonium and plutonium production technology throughout the world should not be underestimated. One recent and conservative estimate is that 8,000 kilograms of plutonium will be produced annually in civil nuclear power reactors by 1970 and 50,000–70,000 kilograms annually by 1980. The corresponding amounts of plutonium accumulated in the world as a result of past production is estimated to be 28,000 kilograms by 1970, and 300,000–450,000 kilograms by 1980. Thus, the stockpiles of plutonium used in civil nuclear programs will soon dwarf the amounts of

[1] I have made a full analysis of the Treaty and the major problems of interpretation and implementation in *Non-Proliferation Treaty: Framework for Nuclear Arms Control* (Charlottesville: The Michie Co., 1969).

[2] See Willrich, Mason, "ABM and Arms Control" in *International Affairs*, Vol. 44, No. 2, April 1968, p. 228.

fissionable materials in the nuclear weapons stockpiles of the nuclear-weapon nations. Yet, less than 10 kilograms of plutonium is needed for a bomb which will destroy a medium-sized city.

By 1980 civil nuclear power programs in Japan and West Germany, the two most prominent non-nuclear-weapon nations, will be producing every year almost 5,000 kilograms of plutonium—or the equivalent of 500–1000 nuclear weapons. Furthermore, both Japan and West Germany plan to build their own chemical processing plants for the separation of plutonium produced in their nuclear power programs. Significantly, India already has such a chemical separation plant in operation.

Compounding the complexity of the security implications of civil nuclear power is the fact that a technological breakthrough appears to be occurring with respect to the gas centrifuge process for enriching uranium. There are strong economic and political incentives to achieve this breakthrough in view of the better performance of slightly enriched uranium compared with natural uranium as a reactor fuel, and the dependence on the United States for enrichment services that would result if a nation used slightly enriched uranium fuel for its civil nuclear power program without an enrichment plant of its own.

The security implications of the successful development of gas centrifuge technology are profound. Uranium enrichment is the most direct route to nuclear weapons. Moreover, highly enriched uranium is the fissionable material which is strongly preferred as the trigger for a fusion weapon. A gas centrifuge plant would be substantially less costly than a gaseous diffusion plant, which is the existing type of plant for uranium enrichment. Gas centrifuges would also be easier to conceal than a gaseous diffusion plant, although I would not stress this point as much as others have.

Research and development work on the gas centrifuge process for separation of uranium isotopes is already well advanced in several nations, including Japan, West Germany and the Netherlands among the non-nuclear-weapon nations. Work in this field in the United States is highly classified. The United Kingdom, the Netherlands and West Germany are, however, reported to be pressing forward with cooperative plans for the construction of a prototype gas centrifuge plant. Thus, during the 1970's it is quite probable that the technology for enriching uranium in addition to the technology for producing plutonium, will become available to several industrially advanced nations of the world, whether or not they now possess nuclear weapons.

The Non-Proliferation Treaty would have two effects on the development of civil nuclear power programs in non-nuclear-weapon nations. Article III would require all non-nuclear-weapon parties to accept international safeguards on all their peaceful nuclear activities. Article IV, although ambiguous and susceptible of a variety of interpretations, would in general commit those parties to the Treaty which have nuclear capabilities—peaceful as well as warlike—to assist the further development of civil nuclear power, "especially in the territories of non-nuclear-weapon States Party to the Treaty. . . ." In essence, the Non-Proliferation Treaty reaffirms and reinforces long-standing United States policy which began with President Eisenhower's Atoms for Peace proposals in 1953.

Without doubt nuclear fuel offers large potential benefits in the generation of electric power at a lower cost in certain areas of the world when compared with the costs of alternative fossil fuels. Nuclear fuel also offers increasingly important advantages in terms of environmental effects—much less air pollution, although somewhat more thermal pollution of cooling water than coal or oil.

But what are the security costs—to the United States and to the world community—of the growth of civil nuclear power programs in non-nuclear-weapon nations? Have the adverse security implications of civil nuclear power which are apparent and immense been taken fully into account?

The answer given to these questions is that the international security costs of civil nuclear power programs have been largely offset by the policy objective that civil nuclear power programs in non-nuclear-weapon nations should be made subject to international safeguards. This is the objective of Article III of the Non-Proliferation Treaty.

Thus, the ramifications for United States and international security of the production and accumulation of very large amounts of fissionable materials in non-nuclear-weapon nations will depend on what safeguards are and how they will affect the situation. It is indisputable that without external control on civil nuclear power programs, especially in non-nuclear-weapon nations, that the availability of fissionable materials will in the near future create a major and widespread threat to international security and stability.

Safeguards consist merely of a system of international accountability applied to the nuclear materials used, produced and processed in a peaceful nuclear activity located in a state. The system includes reports to an external authority and physical inspection by that authority to verify the accuracy of the reports.

The nature and effectiveness of safeguards as an assurance will depend on the margins of the uncertainties in the accountability system; the anticipated and forthcoming responses of nations which might suspect diversion in other nations; and the resulting reliance which nations will place on safeguards in relation to their national security. These factors are, of course, interrelated.

No system of safeguards will be able to account for every gram of fissionable material used, produced or processed in a nuclear power program. The accountability system will contain its own internal margins of uncertainty, and the system will be applied to a nuclear fuel cycle in which processing losses are inevitable in every phase. As nuclear power programs are established in more and more nations, and as these programs increase in size, a corresponding growth in the international authority administering safeguards will be required. This will in turn require development of more definite accountability standards. In the process of establishing standards the development of parameters may be a technical task, but the choice of standards within those parameters will be political.

Disparities among nations in the amounts of plutonium accumulated in their peaceful nuclear power programs are likely to increase over time. As the gaps widen, the interests in international safeguards of nations with very large nuclear power programs, such as West Germany and Japan, are likely to diverge increasingly from those of nations with smaller programs. The divergence of interest may well manifest itself in different views of what constitutes an adequate safeguards system.

Nations with large nuclear power programs, feeling less threatened by nuclear power programs in other nations and more burdened by the application of safeguards to their programs may resist measures to reduce uncertainties, especially if one of the costs of reduction would be increased international intrusion into their nuclear operations. Nations with small nuclear power programs, on the other hand, especially those without chemical processing plants of their own, are likely to view a safeguards system that is merely maintained at its initial level of effectiveness as a security assurance that diminishes over time.

How will nations respond if diversion of fissionable materials from a civil power to a nuclear weapons program is suspected? It is highly unlikely that an international inspector will ever be an eye-witness to, or receive direct evidence of, a diversion. The most that can be expected from safeguards is indirect evidence—an ambiguous discrepancy in the suspect nation's materials balance system, or procedural roadblocks put in the way of international inspection of a particular nuclear facility at a certain time. In either event, the suspect nation could involve the international inspectorate and nations most immediately concerned in a lengthy process of clarification and debate. Throughout this process the international authority, and each nation for itself, would have to determine whether and how far it wished to press the matter.

But it is doubtful that any nation would embark upon a secret nuclear weapons program unless, upon discovery, it was prepared to continue. Thus, the course of action of any suspect nation would be fixed, while action by other nations to stop the weapons acquisition process would be difficult to launch.

Forcible intervention would probably have to occur, if at all, before a nuclear weapons capability became operational. Yet the safeguards system would give few clues as to exactly how far a clandestine nuclear weapons program had proceeded. The general incentive in the international community to maintain the Non-Proliferation Treaty and its basic policy of preventing a sixth nation from acquiring nuclear weapons may be strong. But it would still be difficult to translate this general incentive into a swift and forceful response from the international community at large.

Those nations which would call the loudest for intervention in the suspect nation would be those which believed themselves to be immediately threatened: for example, the Arab nations in the case of Israel, or the East European nations in the case of West Germany (assuming these nations become parties to the Non-Proliferation Treaty). But these nations would be unable to execute the sanctions required without starting a dangerous local war which they might lose. The burden of effective action would probably fall, therefore, upon one or the other of the two superpowers, the United States and the Soviet Union. Resort to the threat or use of force by either the United States or the Soviet Union in order to deny a sixth nation a nuclear weapons capability could place the superpowers in a morally untenable position in the eyes of the world community.

In light of the preceding analysis, how much reliance will nations place on safeguards? The governments of most nations have not yet faced this question squarely. The result thus far may be some misplaced confidence.

Will safeguards, as is frequently claimed, be a reliable assurance that fissionable materials accumulated in nuclear power programs are not used in nuclear weapons? Or will safeguards merely provide a reasonably accurate measure of the security threats implicit in civil nuclear power programs? Are safeguards more analogous to verification that nuclear disarmament measures are carried out, or to observation satellites which count the number of nuclear missiles deployed by the nuclear weapon states?

A system of international accountability and inspection is clearly only part of an adequate response to the challenge to the international system presented by the growth and spread of civil nuclear power. International ownership of fissionable materials and international operation of certain key nuclear facilities such as chemical separation and fuel fabrication plants could provide greater security control over plutonium than any system of safeguards. But any movement in these directions wuold require that the strong forces of economic nationalism operating in the civil nuclear power field be reversed in the very near future.

Such a reversal will not occur unless there is a clear awareness at the highest political levels of the security risks involved. These risks will affect our allies more than us.

Coming to grips with this difficult problem will cause dissension, especially in United States relations with its principal allies in which civil nuclear power is taking hold. To postpone dealing with the problem, however, is to lose the opportunity forever. If we do not develop with our allies and the world community at large a clear view of the nature of the security problem associated with the growth of civil nuclear power, and especially if we are lulled by the idea of safeguards into thinking the problem has been solved, exploitation of atoms for peace in one nation could well be viewed by others as the creation of a major threat to their security. Civil nuclear power clearly has the potential to disrupt delicate relationships within alliances and destabilize sensitive balances between alliances, unless along with the application of international safeguards to civil nuclear power programs, a related system of sanctions in the event of diversion is carefully worked out and made explicit.

The International Atomic Energy Agency Statute sets forth procedures to be followed in the event of violation of its system of safeguards—the system on which Article III of the Non-Proliferation Treaty is based. These include: a report by the inspectors to the Director General; the transmittal of the report by the Director General to the Board of Governors; a call upon the state concerned to remedy the situation if non-compliance is found by the Board; a report by the Board to the members of IAEA and to the U.N. Security Council and General Assembly; and the Board's decision to curtail or suspend assistance in event of failure of the state concerned to take "fully corrective action within a reasonable time," or to call for the return of materials and equipment previously made available. Provision is also made for suspension of the non-complying state from membership in the IAEA.

Suspension of the flow of materials and the provision of enrichment, fuel fabrication, or reprocessing services obtained abroad is the key step in the sanctioning process. But such a sanction would be without effect unless the suspect nation was dependent on foreign sources of supply. This reinforces the advantages from the overall *international* security point of view of interdependance of civil nuclear power programs, but considerations of *national* security and security of energy supply cut in the opposite direction.

In any event, sanctions associated with the Non-Proliferation Treaty safeguards system must be based on a consensus in the world community favorable to non-proliferation of nuclear weapons in order to be effective. Such a consensus must be both broad and deep. Few of the nations which are now or will shortly arrive at the nuclear weapons threshold are presently committed to maintaining a world order which includes the Non-Proliferation Treaty as a building block. In the decade ahead a primary task of the nuclear-weapon nations—the United States and the Soviet Union in particular—will be to work toward the creation of an international political climate in which nations in the process of establishing large nuclear power programs will see it in their own interest to refrain from structuring their programs in ways which may appear provocative and threatening to the security of other nations. An essential ingredient of such a political climate will be the achievement of concrete results by the superpowers in their own nuclear arms control negotiations.

II

Let me turn now to the resolution of the United Nations Security Council adopted on June 19, 1968, outside the framework of the Non-Proliferation Treaty but intended to provide non-nuclear-weapon nations which become parties to the Treaty with assurance against nuclear attack. Will it follow from this Security Council resolution that, as declared by the three proponents, any state which commits or threatens nuclear aggression "must be aware that its actions are to be countered effectively * * *"? Does such Security Council action constitute a reliable nuclear security "umbrella" over the non-nuclear-weapon nations which becomes parties to the Non-Proliferation Treaty?

A major weakness of the Security Council assurances resolution is that the events which will bring it into operation are "aggression" or "the threat of aggression" with nuclear weapons against a non-nuclear-weapon state. Thus, the resolution rests on the well-known and unresolved problems of defining aggression and identifying the aggressor. Determination of the threshold question whether "aggression with nuclear weapons" has occurred in a particular case will be by the usual Security Council voting procedures on matters of substance, including the veto of any one of the five permanent members. Any action "through" the Security Council under the assurances resolution will require the support or acquiescence of not only the three sponsoring nuclear-weapon states, the United States, Soviet Union and United Kingdom, but also the other two permanent members of the Security Council, France and Nationalist China. Since Nationalist China is both a non-nuclear-weapon state and a prime target for nuclear threats from Communist China, it would probably support action under the security assurances resolution. It is not so clear where France's interests lie in concrete cases. But the resolution gives France, which has refused to sign the Non-Proliferation Treaty, a large influence over the operational effectiveness of the security assurances which many non-nuclear-weapon states view as a vital, if not integral, aspect of that Treaty.

The security assurances resolution also reaffirms the right of individual or collective self-defense under Article 51 of the United Nations Charter. This reaffirmation may be viewed as serving two main purposes. First, it negates any suggestion, which might be inferred from the pledges by the three nuclear-weapon parties to the Treaty to seek action through the Council, that they had delegated in their statements of intention any veto-free power to the Security Council. Second, reaffirmation of the rights of individual and collective self-defense provides a fall-back assurance to the non-nuclear-weapon states if assistance from or through the Security Council is not forthcoming. It recognizes nuclear security guarantees which already exist in collective security agreements with the respective allies of the United States and the Soviet Union, without adding to or detracting from them. Moreover, if the United States and the Soviet Union were in agreement, neither the veto of any other Security Council permanent member nor the absence of sufficient time for Security Council action could block coordinated super-power action outside the Security Council on the basis of the right of collective self-defense.

What, in practice, might the security assurances resolution accomplish? We have been told by both the Johnson and Nixon administrations that resolution does not create any additional responsibilities for the United States, and yet it has been claimed that it is "politically of very considerable importance" that three of the permanent members of the Security Council have made it clear that nuclear aggression fell squarely within the primary responsibility of the Security Council. The veto which each permanent member possesses limits the probable target of Security Council action to China, and no other potential nuclear aggressor. In this respect, the Security Council may become a principal organ for future collaboration between the United States and the Soviet Union in the containment of China—as long as China is not a member of the United Nations. China sees the Non-Proliferation Treaty as just such collusion between the superpowers. United States-Soviet Union collaboration in this respect will be a mixed blessing. It could in particular limit the possibilities for future accommodation between the United States and China.

Nevertheless, such open and institutionalized cooperation between the two superpowers seems an important ingredient of any meaningful security assurance to non-aligned, non-nuclear-weapon states such as India. It is ironic indeed, in this respect, that India, which was originally intended as the primary beneficiary of the Security Council resolution, has declared its intention not to become a party to the Non-Proliferation Treaty. Thus, India has apparently decided that whatever security benefits there are in the resolution are not worth the price of joining the Treaty.

III

Finally, a word about nuclear-free zones. In my judgment, this is not a very important issue because the prospects for the early entry into force of the Treaty of Tlatelolco, which would establish a nuclear-free zone in Latin America, are not very promising. A number of proposals have been advanced for nuclear-free zones in the past in a variety of areas. Preliminary steps have been taken by the Organization of African Unity to establish a nuclear-free zone in Black Africa. The Soviet Bloc has for years urged the creation of a nuclear-free zone in Central Europe, which, if implemented, would result in the removal of United States nuclear forces from West Germany. As might be expected, all such proposals have been given short shrift in NATO thus far.

How does a nuclear-free zone differ from the obligations which the Non-Proliferation Treaty would impose on non-nuclear-weapon parties? There are three major differences.

First, a nuclear-weapon state would be prohibited under a nuclear-free zone from deploying nuclear weapons within the zone, even though ownership and control were retained by the nuclear-weapon state. Thus, the Treaty of Tlatelolco would prohibit the signatories from accepting the deployment on their territories of nuclear weapons by any nuclear-weapon state. With respect to the Treaty of Tlatelolco, however, the United States has indicated its understanding that it would continue to retain the right to transport nuclear weapons through the nuclear-free zone, and in particular through the Panama Canal.

Second, in a nuclear-free zone as contemplated by the Treaty of Tlatelolco, there is provision made for inspection if clandestine nuclear activities are suspected within the zone. Under the Non-Proliferation Treaty, safeguards are applicable only to declared peaceful nuclear activities in a non-nuclear-weapon party.

The third difference pertains to the undertakings of the nuclear-weapon states to respect the zone. The United States has signed but not yet ratified Protocol II of the Treaty of Tlatelolco which contains an undertaking "not to use or threaten to use nuclear weapons against the Contracting Parties. . . . ." In signing the Protocol the United States made a statement narrowing the scope of its commitment not to use nuclear weapons to circumstances where no other nuclear-weapon state is involved. Nevertheless, this is the first time a United States government has agreed to accept any legal restriction on its right to use nuclear weapons other than the general restraints on the use of force contained in the United Nations Charter.

Of course, the Senate will probably not act upon the Protocol until the future prospects for putting the Latin American nuclear-free zone into effect become considerably brighter. Thus, the issue does not seem to have much urgency at present.

(The biography of Mr. Willrich follows:)

MASON WILLRICH

Mason Willrich, Esq., is Professor of Law at the University of Virginia and Director of its Center for the Study of Science, Technology and Public Policy. Previously, Professor Willrich served as Assistant General Counsel in the United States Arms Control Agency.

Born in California in 1933, Professor Willrich received the B.A. degree from Yale University and the LL.B. degree from the School of Law of the University of California at Berkeley.

Professor Willrich was admitted to the bar of the State of California in 1961. With the Arms Control and Disarmament Agency from 1962 through 1965, he served on the U.S. Delegation to the Eighteen-Nation Disarmament Committee in Geneva and to the International Atomic Energy Agency in Vienna.

He has served as a consultant to a number of agencies, including the U.S. Arms Control and Disarmament Agency, the U.S. Naval War College, and the Washington Center of Foreign Policy Research of Johns Hopkins University.

Professor Willrich has written extensively for periodicals on the control of nuclear weapons and their development as well as on the control of civil nuclear power. The July 1968 Hearings of the Senate Foreign Relations Committee on the Nonproliferation Treaty contain his testimony and a prepared statement on the Treaty. A recent work, *Non-Proliferation Treaty: Framework for Nuclear Arms Control*, was published by the Michie Company.

Mr. ZABLOCKI. Thank you very much. Both of your statements are very fine statements. We appreciate your presentations.

Dr. Rostow, the theme of your remarks is that there is nothing

wrong, basically, with U.S. alliances that closer cooperation among the nations will not resolve. But how likely, really, is increased cooperation, now that the world has turned away from the bipolar alinement?

Dr. ROSTOW. There are, as I tried to indicate, conflicting forces at work within our European alliance and our relationship with the main countries of the Pacific as well, a desire for independence, on the one hand, a desire to avoid the strain and the conflict of political tension, but at the same time an increasing awareness of their dependence upon the United States on the other.

As I said in my prepared remarks, the paradox is that, 20 years after the war, despite the political, economic and social recovery of Europe and Japan, Europe and Japan are now more dependent on protection by the United States than was the case 20 years ago, because of the threat of nuclear weapons.

So I think that all we can hope for and work for is that reality will prevail over illusions, and that patterns of increasing cooperation will develop, as they have developed in many areas. Take, for example, the area of cooperation among the rich countries in helping the developing nations.

There, within the last few years, we have seen an extraordinary shift to multilateral aid programs in which the U.S. share has dropped steadily. These consortia or consultative groups are organized under the chairmanship of the World Bank or the IMF and really function as effective instruments of cooperation and burden sharing. They are much more effective, I think, in providing advice, technical assistance, and aid to the developing nations than a series of bilateral programs could be.

In the field of economics, where we have seen the Kennedy round and the Rio agreement in the last couple of years, and very effective cooperation in heading off a number of monetary crises, there I think the choice has been made to preserve a single, unitary world economy with enormous advantages for all concerned, and to cooperate in building it up, in strengthening it, rather than weakening it.

It would be very easy to move toward autarchy and fragmentation through policies of protectionism in the face of the enormous difficulties and strains of the balance-of-payments problems in the world. But steadily, crisis after crisis, the countries have chosen the path of cooperation. So I don't despair that this idea will prevail.

I don't mean it will prevail 100 percent. It never does. But I think the pattern can be preserved if we work at it and it certainly should be preserved in our national interest.

Mr. ZABLOCKI. Turning from the closer cooperation with our allies to our alliances, what closer cooperation do you foresee with our adversaries, with the Soviet Union? Let me give you an example.

Would you care to comment, if we recognize or have some trade relations or closer relations with China, will this enhance or deter our closer cooperation with the Soviet Union? How would our efforts in trying to get closer relations with one or the other react on one or the other, or how would it affect our national security?

Dr. ROSTOW. From the beginning of the cold war period, the dominant aim of our foreign policy has been to reach some kind of an understanding and accommodation with the Soviet Union, which had been our ally and associate in the war against Hitler. We hesitated for a long time when they broke the Yalta and Potsdam agreements, because of our desire to reach an understanding with them.

We offered the Baruch plan, the rejection of which was the true turning point, the true beginning of the cold war, an irrevocable tragedy from which the nuclear arms race followed.

We offered Marshall plan aid, you will remember, to the Soviet Union and to the countries of Eastern Europe. Throughout this period, American policy under all the postwar Presidents has been very sensitive to the possibilities of reaching an understanding with the Soviet Union that would eliminate or minimize the risks in Europe, in the Middle East, and in the Far East.

I think that will remain a major theme of American policy for profound reasons of national interest because, after all, we and the Soviet Union are now custodians of ultimate power, nuclear power, the power to destroy civilization itself.

We have always sought to find a basis for bringing China into the family of nations on a basis of cooperation and acceptance of the rules of international law. Every time any such approach has been made, of course, some event happened which set back the efforts—the invasion of Korea, or arrests of consuls, or an attack here, or something of that kind.

I think it is extremely important to manage the process of approaching China without threatening or seeming to threaten the possibility of good relations with the Soviet Union. We have done that.

In the fall of 1966, you may recall, we changed our position on the issue of Chinese Communist representation in the U.N. We voted, and voted again the following 2 years, for study resolutions that would examine the problem against the background of the structure of the Security Council. We did it very carefully, without making it an inflammatory issue, because our national goal—and I find in going around the country and speaking, and in resuming my conversation with students after 2½ years down here—nothing needs saying more often: that our national security interest in foreign policy is the creation of a system of peace.

A system of peace doesn't mean that we choose between China and the Soviet Union. It means that we want to have decent and fruitful relations with both, and we want to persuade both to accept the notion of live and let live, and of accommodation within a balance of power and a system of order in which we can all survive.

That doesn't mean self-deception, it doesn't mean illusions, it doesn't mean kidding ourselves that the cold war is over. But it means that if we pursue that goal and keep that goal and that criterion in front of us, we will not be caught in a trap of trying to play one against the other and finding ourselves embroiled, perhaps, with both.

Mr. ZABLOCKI. Do you foresee any breakthrough in our Sino-Soviet policy in the near future? If you do, what, in your opinion, should be the key effort on the part of the United States toward a breakthrough?

Dr. ROSTOW. I am not much of a prophet, Mr. Chairman. I believe we should persevere, as I said in my prepared remarks, and intensify our efforts to reach an understanding with the Soviet Union and Communist China because of the risks of the nuclear race and its escalation.

I think, obviously, the fronts to watch are Vietnam and the Middle East. I can see no reason why we and the Soviet Union cannot reach an understanding on each of these two questions which could lead to

their resolution. That was the way the Korean crisis was resolved in the early 1950's.

As far as the Middle East is concerned, the possibilities of a fair and dignified settlement are there. From what we know of the position of both parties, a settlement, a decent settlement, a settlement of peace, a settlement of dignity, is possible.

What is needed is will, a will to make peace, especially on the part of the United Arab Republic, which has primary responsibility thus far for blocking the Jarring mission. There, I think, Soviet-American cooperation could be, and should be, helpful.

As far as the Far East is concerned, I never thought that any pattern except the pattern of Korea would work. It remains to be seen how far the Soviet Union can and will go in working for peace. There, of course, the element of China in the equation is very important.

Mr. ZABLOCKI. I hesitate to pursue this, but I value your judgment so much, Dr. Rostow. I know there is no easy solution. But if there is any further specific steps that we should take that you have in mind, would you care to share them with us?

Dr. ROSTOW. I think the only possibility of finding these formulas, I think, is through quiet diplomacy, and I have no magic formula to provide or to offer. Whatever thoughts I had, of course, I turned over to Secretary Rogers when I left, and I have had no new inspiration since.

Mr. ZABLOCKI. I thank you.

I might say to both witnesses, you can comment whenever you desire on any question asked. We will not press for an answer, but you are free to make any comment you want on any answer and on any question.

Governor Thomson.

Mr. THOMSON. Thank you, Mr. Chairman. I would like to ask Mr. Willrich a question.

I am a little bit disturbed about your comment on the peaceful use of atomic energy. I thought possibly President Eisenhower and Mr. Strauss had a tremendous idea about desalinization in Israel and the Arab States, that were going to turn them into a Garden of Eden. They would all have viable economies. Now you have suggested that they could acquire enough fissionable material to become nuclear powers. Certainly that raises some grave questions.

What are the requirements in changing civil nuclear programs into military programs? How long would it take?

Mr. WILLRICH. I might address myself first to the precursor to your question about what are the requirements, if I might. I have looked into the question of the proposals that were advanced by Admiral Strauss and on which I believe some hearings were held in the Senate Foreign Relations Committee.

I must say that I was rather amazed on the details of those proposals to find out that what actually was proposed was ultimately 2,200 megawatts of installed electric power, which would produce, in addition to the electric power, 3,000 million gallons per day of water. There would be three plants and the total electric capacity would be 2,200 megawatts, and each of the plants would produce 1,000 million gallons per day of water.

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The proposal was, as expressed by Admiral Strauss, for the first plant to be located in Israel, for the second plant to be located in Israel, and for the third plant to be located in Jordan or Israel. It seemed to me that this was a rather unbalanced approach to peace in the Middle East.

Moreover, it seemed to me that in terms of installed nuclear power capacity, it was clearly recognized that the Middle East would be unable to absorb this amount of electricity if it were ever produced. The total installed capacity of Israel today is about 720 megawatts. So if you envision adding in 2,200 additional megawatts, you are in trouble finding a market for the electricity which comes off.

I have difficulty also in seeing the logic of adding these very large and complicated technological fixes to what are basically very difficult political problems. I think you have to take a political approach to political problems. The technological fix usually works out costing you a lot of research and development money and frequently is not implemented.

Now, as to the requirements for a nuclear weapon from a civil nuclear power program, a nuclear fuel cycle consists of uranium which thereafter moves into a fuel fabrication plant, or it goes through an enrichment plant where it is slightly enriched, not fully enriched to weapon-grade uranium, and formed into fuel elements.

From there it goes into the reactor and it is irradiated. At that time the plutonium is produced in the fuel elements. Then the fuel elements are removed from the power reactor and go into a chemical processing plant where, by chemical means, the plutonium which has been produced is separated out. It is a chemical processing plant that you arrive at a point where you have in your hands plutonium that is available for either recycling into a peaceful nuclear fuel program or possibly diversion into a military program.

If you talk about the speed with which a country could acquire nuclear weapons if it has its own chemical processing plants, as India does already, as West Germany, Japan, and a couple of others plan to have in the very near future, then the step from a civil nuclear power program to a weapon program can be very short.

On the other hand, if you don't have a chemical processing plant, then it would take some time in terms of if you had reactors, to build that plant, if you are relying on foreign sources for chemical processing services. So the leadtime would be considerably longer.

Finally, if you talk about having enrichment technology, if you have a plant for enriching uranium in your territory, then, of course, the leadtime would be very short. I don't believe there is any particular magic in designing a crude nuclear weapon that will work.

Mr. THOMSON. You talk about a short leadtime or a longer leadtime. What are the time elements?

Mr. WILLRICH. There is a lot of speculation about this. Much depends upon whether a country is conducting a military research program along with its civil nuclear power program.

My understanding of the nonproliferation treaty is that it does not prohibit anything short of what is termed in the treaty "manufacture." There is a great deal of dispute as to what actual weapons manufacture consists of. But assuming a nonproliferation treaty is in effect, if a civil nuclear power at the same time has a research pro-

gram going on regarding design, I would say that all you have to do is to stop at the safeguards, take the plutonium out of the chemical processing plant and build your bomb, and you could do it in 6 months.

Mr. THOMSON. Have you concluded that we were misguided in our atoms for peace program or that we have failed to have adequate controls?

Mr. WILLRICH. That is one of the really difficult questions. I don't think it is really too helpful to look backward on this one, because it is over and done with. I don't particularly enjoy mounting attacks on prior administrations, whether they are Democrats or Republicans, because clearly both administrations, both Republicans and Democrats, have supported atoms for peace.

I believe if we had it to do over again, knowing what we know now, that we might have taken an approach which would not have quite the accelerating effect that we have had, not only for the security implications, but because of the economic implications. The economic implications—our economic projections—have historically been overly optimistic.

I would rather look forward. If you look forward, it becomes very pessimistic unless you are willing to put some real foreign policy muscle behind a thorough analysis of what the problem really is.

My main point in the statement is that I do not believe that if you take a broad look at the executive branch and a broad look at the Congress, and a broad look at the American people, that any one of those three segments are aware of what is very clearly foreseeable in terms of technological trends.

Dr. ROSTOW. Could I add a word on that, Governor? It might be helpful.

I agree with Professor Willrich that the spread of plutonium in the world is a very real problem, a very alarming problem in many ways, and that the nonproliferation treaty is one road to an answer, or one theme of a possible answer providing for safeguards, as he said, and for inspections and verifications and so on. It may not be sufficient.

I am not concerned as he was about the security implications of the development of civil nuclear power in Europe and Japan. I believe that our working relations with the United Kingdom, with Euratom and with Japan in this field, and their prospective improvement in the light of experience, were adequate safeguards so far as security breaches were concerned.

There is a much greater risk in other areas, where the texture of our political relations is not so secure. I agree it is a problem that needs to be examined and studied carefully.

I don't think one should conclude from this that the reality of the problem throws doubts on the wisdom of the atoms for peace program which has been pursued for the last 15 years, because in the absence of such a program, I think we would have had a much more intensive effort on the part of many countries to become independent nuclear powers themselves.

In this way, many countries say a way of participating in advanced nuclear technology with all its industrial implications without becoming nuclear weapons states. So I think the absence of such a program

would have meant a greater disintegrative force, a greater weakening force within the structure of world politics.

Mr. WILLRICH. May I respond to the respondent for a moment?

I would essentially agree with that; that the most that a non-atoms-for-peace decision could have done would have been to buy us a little more time, and then the problem would have emerged in any event.

You feel that it would have accelerated, had we not taken the decision. But what concerns me is not so much our working relations with Japan and West Germany in this matter, which I think probably are good, but, rather, the impact on other countries and, therefore, the indirect effects on our working relations with West Germany and Japan of their really major civil nuclear power programs.

I am concerned about just the availability of plutonium in West Germany on, for example, West Germany's relationship with Eastern Europe, with Sweden, and even with France and Italy. I think those are the relationships which will indirectly affect U.S. foreign policy in a very substantial way. By the same token, Japan's capabilities will affect our relations with the countries in Asia.

Mr. ZABLOCKI. If I may at this point, it is my understanding that the United States has undertaken through private enterprise—General Electric, specifically—quite an export program in the civil nuclear program in the various countries, even smaller countries. Are you aware of this, and can you provide for the committee the extent of the civil nuclear program where the United States is a party?

Mr. WILLRICH. I would prefer that you get that kind of information from the Atomic Energy Commission, because I am sure their sources would be accurate. It is readily available, Mr. Chairman. I might comment that you omitted, just to get the record straight, one of the competitors, Westinghouse.

Mr. ZABLOCKI. GE and Westinghouse.

Mr. WILLRICH. I have no interest in either, so I can put them both on a par. There are some other countries who are also interested in getting into the business of foreign sales. I think, though, in the long term, without getting into the precise numbers of sales—but I do know they have been, for example, to India, Spain, and quite a bit in Europe, and in Europe it is increasingly in the form of licensing agreements rather than actually building reactors there—in the long term these countries are going to acquire their own technology. They may depend on the United States for a while in the form of licensing agreements, know-how agreements, but they are going to acquire their own technology as rapidly as they can.

Mr. ZABLOCKI. It is my understanding, however, that even in underdeveloped countries the United States is entering into agreements with GE and Westinghouse.

Mr. WILLRICH. In the developing countries, the only one that we have actually committed ourselves to is a reactor in India. I believe that is correct. There was quite a competition for a sale down in Argentina, but the West Germans supplied that reactor. Then the Canadians have been supplying reactors to Pakistan, two power reactors to Pakistan. Also, they have been supplying the follow-ons to the reactor in the Indian civil nuclear reactor program.

Mr. ZABLOCKI. Mr. Fulton.

Mr. FULTON. I find myself in an entirely different school. The world to me is not such a terrible place. It isn't always just facing disaster, nor dominated by cruel men or cruel peoples, that will destroy each other on the flick of the switch. I feel that the world is meant for progress and that it should be an open world. So that puts me against the Communists or Fascists or anybody who opposes an open world.

I would never in any relation hold back peaceful development because somebody might shoot me at the door of the plant. I feel that the world should progress. We in America should remember that the only people ever destroyed in anger by any atomic weapon were by us. No other nation has ever destroyed any person in anger except the United States of America.

We are always afraid. Sure, we should be afraid, when we have attitudes like this. If the U.S.S.R. down in Guatemala had nuclear weapons aimed at us and our cities and refused to withdraw, I am afraid that I would be a little bit put out if I lived in the city of Pittsburgh, which I do.

The other point about it is this: If we are going to have a world trade system which binds the nations together, let's get on with it. Let's not go back in history and say that under the Eisenhower administration, 10 years of history, if we had done this and done that it would have been different. As a matter of fact, reasoning on the lines you gentlemen reason, the first conference should be abolishing the automobile because in the United States it is killing 54,000 people this year and maiming thousands of others. That isn't the way civilization develops.

One other point is, if the nuclear threat is so great, obviously the United States should immediately start on an experimental program and take it to the very edge of tolerance in the atmosphere on pollution and then nobody in the world can put any off. You can't have any nuclear weapons in the atmosphere. It makes them all obsolete.

So I am in a much different school. I hope that everybody soon has nuclear and atomic weapons, and they all have the same fears that you have stewing over them 15 hours a day, and that they finally come to the conclusion we can't operate with fears in this world; we have to operate for progress and cooperate.

Don't think that there aren't criminals in the United Nations nor in international relations. There are. One good thing about it is that every nation does not agree with us in the United States. I think that is fine: that there is room for disagreement, because if all the nations agreed with the same establishment, and it becomes one establishment, God help the people who aren't in the establishment, either within the country or in the developing countries, because everything will be done just for them.

My point to the gentleman from Harvard is why don't we emphasize the positive and the optimistic side and stop quarreling so much as to the rate of progress through nuclear and atomic development, even for peaceful means? There is some question here as to whether it should be done.

My feeling, too, is that an integrated world, with a great variety of systems of government and peoples, is probably to be desired.

The second point is, if it is simply a question of time, which both of you seem to accept, until all the nations will have nuclear and fissionable weapons, then the question comes as to whether they will be selling them in high school chemistry sets if it gets this easy. Maybe if we are looking ahead with the purpose of putting nuclear power to constructive uses through these conferences, limiting the use of weapons as we go, they can see in the long run they are going to be equal with us. What do you say to that?

Dr. ROSTOW. In the first place, I don't come from Harvard.

Mr. ZABLOCKI. He comes from Yale.

Mr. FULTON. The other gentleman?

Mr. ZABLOCKI. Virginia.

Mr. FULTON. I had upped you. I am sorry.

Dr. ROSTOW. Seriously, I didn't mean to sound gloomy and pessimistic, Congressman Fulton.

Mr. FULTON. You both did to me. In fact, I sort of weathered you both this morning.

Dr. ROSTOW. But I must say I don't come away from my two years of experience in the Government full of easy optimism. I don't find the problems easy, capable of easy solution.

The chairman referred, or perhaps it was Governor Thomson, to the possibility of finding nice, brave, bold, new solutions in the universities. That is a possibility, and that is what university study should produce—new insights based on deep and disinterested scholarships. I think the net result for we of the experience of working in government for a couple of years is the realization that you don't have a different view of the world in government; you have a little more intelligence or a few frills of information, but not much more. But you do function under an iron law of responsibility. You can't indulge in the pleasure of saying somebody made a mistake 10 years ago and that is the source of all our troubles. That doesn't do you any good.

As one of my colleagues in the State Department used to say, the trouble with this kind of work is that you have to deal with the situation as it is.

The other thing you can't do is to escape from reality by making a Utopian speech about a solution that you know isn't feasible, isn't possible. That puts a certain bleakness into one's perspective. I am sorry about that. I don't mean to sound hopeless. I am not hopeless, and I don't think the risks of a general war are overpowering, but neither am I a facile optimist.

Mr. FULTON. Don't you think when we are going into multilateral aid programs on the world scene much more, that possibly the United States should likewise take the lead in such programs, regardless of governments. And at the risk of maybe seeming out of order don't you think that we ought to go to the U.S.S.R. and ask where we can develop together rather than in competition, going into elements of that constructive type so that we gradually use up the excess energies which we both obviously have?

Dr. ROSTOW. We have tried that. Of course, it takes two to tango. It is very difficult to get them to agree to joint programs, even in the exploration of space, for fear, I think, that they will be exposed to the charge which the Chinese Communists throw at them all the time of collusion with us at the expense of world revolution.

So far none of these proposals for joint action in the field of aid or other areas have matured. But it isn't the fault of the U.S. Government.

Mr. ZABLOCKI. Professor Willrich.

Mr. WILLRICH. I might respond just to respectfully dissent from the view that the spread of nuclear weapons could be a very good thing. I know there is that school of thought.

Mr. FULTON. No, I said nuclear power.

Mr. WILLRICH. I am sorry; I misunderstood you.

On the civil nuclear power point, I want to reiterate my own feeling that I do not attack the original atoms for peace decision. What I am concerned about is that we start from where we are and look forward because, particularly relating to your point, Mr. Fulton, we should try to work toward integration rather than disintegration.

There is, at the present time, integration between the civil nuclear power programs among various countries. However, the trends are in the opposite direction, very clearly. They are toward economic nationalism, and toward the establishment of nuclear power programs which are independent. This is the way the trends go.

I must say that I think, and maybe I just fundamentally disagree with you, sir, that the control of technology, control of our research and development activity, is one of the key issues, if you look toward the future. We have, for a long time—our technology—produced a wonderful range of products, and we have not been aware of various deferred payments that are involved in those products, the automobile and air pollution being a prime example in addition to the 55,000 people who are killed on the highways annually.

What I am very concerned about is that we begin to examine in terms of technological development what the sunk costs, what the full costs in addition to the sunk costs are, what the deferred payments are for society. This is where we really get hung up.

All of a sudden we wake up one day and somebody has to start paying those payments that we have been deferring. Then everybody gets irritated about it.

What I am trying to suggest here is that there is a deferred payment in terms of security that we are talking about in civil nuclear power programs. What I am primarily interested in doing is focusing attention on the fact that that deferred payment exists so that we fully understand what we are talking about.

Mr. FULTON. Where we disagree strongly is that you would put controls on power development, both military and civil, as well as research and technological development, which is a political control for a specific purpose. That purpose is that we shall not destroy each other because that is the most powerful element in your mind.

My comment on that is that it isn't enough to hold back scientific progress and the integration of the world, because we are going to have some people killed. But there is no doubt that it shouldn't be done overall simply because we have some bad actors either at home in the criminal scene, or criminals in the international scene. So I am in exactly the opposite school from you.

I glad to see somebody as intelligent as yourself maintaining the opposite side. You see, your position will not only, as we go, put nuclear and atomic power fissionable materials under a political constraint and restraint, but it will also tend to spread to all research

and technological development, because these are then to you threats in lesser degree. So you would then have a presidium in the world of certain people who have these summits and who then convene and dispose.

Not me, you see. I have already said I want these people to come up to the point where they feel they are equal with us.

The defect of yours is if we limit everything on this high level, it then gets to be size of population which will control. In that race, the United States is already outclassed and will be more so in the future.

Mine is a much different world. Instead of the controls, the neutral zones, which cannot be enforced any more than in Korea or Vietnam, instead of this kind of a patched-up world, with fighting continuing on from year to year against ultimate disaster, mine is more open. Mine is let's go, everybody in.

So you see, you in the organization world fight very well. In mine, the basic organizations would have to change.

Mr. WILLRICH. Let me just negate the implication. At least it was not intended, if there were an implication, that I was suggesting any presidium, either between ourselves and the Soviet Union, between ourselves and our allies, or between ourselves and ourselves.

I share with you the view that the world just doesn't work that way at all. But I will come back to the point that I do feel that one of the key issues, as we look toward the future, is whether world politics, international politics, can master technology, or whether we are going to become the servants of our own technology.

Mr. FULTON. But I am not going to put the child in the speeding Cadillac at 80 miles an hour when it has obviously shown it doesn't know how to control the machine, nor politically advance that way. So I have a much broader base of progress than you speak of.

That is all. Thank you, Mr. Chairman.

Mr. ZABLOCKI. Mr. Fraser.

Mr. FRASER. I will pass for the moment.

Mr. ZABLOCKI. Mr. Taft.

Mr. TAFT. Thank you, Mr. Chairman.

Professor Rostow, I was rather interested in your comparison in your paper between the nice, pure, unadulterated, George Washington-type of isolationism, and the neoisolationism of today.

It seems to me that there are some pretty broad differences that raise some questions of validity of any comparison. Let me start with one specifically. That is to suggest that the dominant attitude on the campuses and in the academic world, toward the question of isolationism seems to have been completely reversed between these two periods.

Would you care to comment on that?

Dr. ROSTOW. Yes, of course I will, Congressman Taft.

When I joined the Yale faculty in 1938, the atmosphere, I won't say the dominant atmosphere, but at least the most visible and audible atmosphere, was strongly isolationist, very much against getting involved in the war in Europe. As a matter of fact, some of the same people are still functioning, and making the same speeches.

So I would say attitudes in that sense haven't changed at all. I wanted to distinguish three or four different classes of critics of our foreign policy in my prepared statement.

Mr. TAFT. To move on a little further, if I might, within a couple of years later this had reversed, had it not, from 1938?

Dr. ROSTOW. Only after Pearl Harbor; not until then. What the basic opinion was, if you had taken a Gallup Poll, I think, would have been pretty much what the opinion was in the country. But the visible, audible opinion, the decibels were being made by the American Firsters then. That was just as true at Harvard.

Mr. TAFT. I must have been an unobservant student. My impression of the faculty at that time in the universities generally was exactly the contrary.

Dr. ROSTOW. I was engaged then as a young faculty member in a prolonged seminar with other colleagues. I was, I think, really the only full-throated interventionist, the only William Allen Whiter around.

But I think the attitude or basic theme that I found so central in my own effort to explain foreign policy to audiences around the country during the last couple of years, and in my own thinking about it, is that this tension between the past and the present, is the key question in determining American attitudes toward world affairs. We have to get over our experience of isolation, reason it out and persuade ourselves emotionally that the world has indeed changed since 1900, and that there is no one any more to protect us as the British and the French used to do. We have to do this, I believe, before we can accept the world as it is and the burdens which have come to us, not as transitory, one-shot operations that we can engage in and then pull back, as we did in 1917, but as a continuing part of our political lives, attracting allies, building up coalitions, building up circumstances in which we won't have to bear so much of the burden, but never escaping this responsibility which is a responsibility to ourselves, for our own security.

We do not engage in world politics to be kind to anyone else. Our programs are designed to protect our own national interest in achieving a situation in which, as Congressman Fulton says, we can live in an open world, moving around, having contact with people, not living in a garrison state.

To me, that is the central problem of our foreign policy. As you noted in my prepared remarks, I did have a little fun trying to distinguish among various classes of critics. But I wanted to stress that if we pick the right premise, if we can agree on what the criterion is for judging our foreign policy, then at least we will eliminate some irrelevant kinds of criticisms, attacking policy for the wrong reasons.

Mr. TAFT. Of course, there is a new factor in this whole question, is there not? That is that behind the thinking in connection with our international policies today there is a question of putting a priority between domestic policy and international policy?

I have a hard time seeing that that was a major factor in the isolationism of the pre-World War II era. For one thing, there wasn't the tremendous volume of governmental activity in every field and there wasn't a recognition of the need for making progress as quickly on some fronts.

Dr. ROSTOW. I remember one of the Yale professors of that period who was intensely aware of the risks that the rise of Hitler represented for the United States proposed a naval building program as a cure for the depression—a big policy of shipbuilding as kind of a public works program, addressed to the depression.

But there is, of course, that concern now, and a very natural concern it is. I, myself, can see no conflict between social progress at home, which I strongly favor, and maintaining the safety of the Nation abroad, which I also strongly favor.

We are growing at the rate of nearly $50 billion a year in gross national product. Our tax rate is not what it was even during the Korean war. We can afford progress and security. The question is, do we understand the nature of the problem and are we, therefore, willing to pay for it?

Mr. TAFT. Let me move to one other question, if I might. That is this:

Both of you gentlemen are professors of law. It seems to me that one of the real problems that we have is that there has been simply no progress whatsoever insofar as the development of international law is concerned during a period in which the problems have multiplied many times. There have been attempts to approach this.

I remember Ambassador Goldberg's statement when he took over the U.N. job. I had a burst of hope that we were going to see some real leadership by the United States in the field of developing leadership in international law. But I am afraid that I don't see it now.

Are we going to be able to do something about this? Do you have any suggestions about what direction we can go? We are talking about the nuclear situation. Should we take some kind of a position with regard to nuclear agreements, anyway, that we automatically give the World Court jurisdiction or give some other body jurisdiction over disputes, and attempt to build some set of standards or body of law so that we are not simply dealing on an ad hoc basis with each situation?

Dr. ROSTOW. I put the little book I finished last December in the framework of international law and its evolution under the stresses of modern political life for precisely the reason you mention: That we have a very great interest, I agree, in consolidating and developing international law and should take the lead, insofar as leadership is possible, in that work.

But the interplay between politics and experience in law is just as real in international law as it is elsewhere. The basic problem I addressed in that book, the control of aggression, requires not the development of new law, but the acceptance of existing law, namely, the law of the Charter of the United Nations which codifies law which had been emerging for nearly a century—a legal doctrine of a political principle making aggressive war a crime, or at least an offense against the law of nations.

So here we have not so much a problem of developing law as getting its acceptance. In the area of the United Nations activity, an enormous amount of work is going on in the codification and the revision of existing public international law with respect to maritime law and the law of treaties, and a good many other subjects. There the United States has taken and is taking the lead, but trends in this area I think, are worth studying. They are not all constructive trends from the point of view of our own view of law and from the point of view, I think, of most students of law, because you have political groups within the world now trying to rewrite international law to suit their own taste and habits.

That, of course, is a normal practice in the world, but it is producing conflict. There is conflict in the law of the sea with regard to fishing which has caused so much friction during the last few years. It is practically an insoluble controversy. Countries are claiming a 200-mile fishing jurisdiction, which we and the other great maritime nations simply cannot and will not accept, such a rule would be contrary to international law as we understand it, and yet the claimant countries are not willing to submit those disputes either to the International Court or to arbitration.

Here you have a flat collision between the concept of sovereignty and the notion of international law which we are trying to work out as best we can through treaties, through a series of agreements. They might conceivably move maritime law into another phase. There is a possibility of another conference on the law of the sea in the future but it is by no means certain that such a conference or the processes of politics will produce an improvement in international law. We may well witness on the contrary, some real disintegration of international law.

I sympathize with your aims, and I am all for them, but I don't think we are going to be able to make progress in many of these areas except through the processes of politics themselves.

Mr. WILLRICH. I would agree wholeheartedly with what Professor Rostow has said on this point. Being against international law is like being against motherhood. We can't be against either, and I am not.

But I must say that I think that a lot of international law escapes public attention. We think of law, if you are not in the Congress, as what happens to you when you go to court. I think what we need to do is to reevaluate what we really mean by "law." If you look around in terms of domestic law, there is an enormous quantity, and some of the most important law that is on the books in the United States is law that is not implemented.

So there is very little difference, I think. In fact, there is an increasing less difference between the legal process internally, domestically, in the United States, and the legal process in the international realm. I do think there has been a lot of progress made, as far as the development of international law is concerned, in specialized agencies of the United Nations.

Certainly, Professor Rostow is the expert on Comsat.

There have been a lot of strides made with civil aviation and things like that.

But I come back to the necessity, if you are going to look at this with a clear eye, that you have to define very concretely and very specifically the nature of the political, or the economic, or the political-economic problem, that you are dealing with, before you start talking about legal solutions.

Secondly, I think we ought to start looking at international law, really at the procedural level more than the substantive level. I am not a legal historian, but I believe that most of the English common law was developed out of the procedural concerns to begin with. I would say that international law is just barely beginning to get at these procedural problems.

In counseling people about what it is all about, I would suppose I would just say that it is an effort to develop reasonable ways of

getting a job done. If you were to try to set up a substantive rule that everybody could agree on, it would be so general as to be meaningless and require some machinery to implement it in order to determine what rule it was that you agreed upon in the first place.

Mr. ZABLOCKI. I think Mr. Taft has certainly brought up a very interesting point. If I may pursue it from another angle, certainly there are problems we have in international law, abiding to such agreements spelled out in our various agreements and international bodies, but it brings me to the point of a very serious problem.

In yesterday's testimony, we heard that anywhere from 50 to 100 nuclear arms states will be in existence by the end of the century.

Gentlemen, do you foresee this situation? If you do, how will this situation affect U.S. foreign policy?

Apparently there will have to be some political solution. We will be obliged to have some international law formally to deal with this situation.

What initiatives in U.S. policy will be necessary, in your opinion?

Dr. ROSTOW. Well, I don't know whether that would be a feasible world or not.

Mr. ZABLOCKI. May we have your valuable judgment as to whether our witnesses were within the ballpark as far as 50 to 100 nuclear arms states?

Dr. ROSTOW. It is possible, but I wouldn't confirm it as a prediction. I think it is terrifying.

Mr. WILLRICH. Just on that point, I would say that 50 is definitely on the high side, and that 100 is way out of the ballpark. If you have further proliferation by the year 2000, I would guesstimate something like 15 or 20.

Mr. ZABLOCKI. Even 15 to 20 nations is frightening.

Dr. ROSTOW. There is a school of thought represented by General Bauffre and others that thinks such a state of affairs would be excellent for world politics. They assume a complete paralysis of nuclear weapons, with no one daring to think of using nuclear weapons in a network of this kind, and, therefore they conclude that the world could go about its business relieved of the nuclear problem by proliferation itself.

I have never been convinced by this argument. I have supported, of course, the approach of the nonproliferation treaty to try to eliminate further proliferation through political understanding between the United States and the Soviet Union. But I don't think the nonproliferation treaty can work or will survive unless it helps to bring about a degree of political cooperation between the Soviet Union and the United States which will make the world manageable. I suppose you can get used to anything—we have, in fact. We have lived since the end of the war, or at least during the last 10 or 12 years, or more than that, 15 years, in the shadow of nuclear weapons held by two, three, four, and now five nations.

So, I suppose it is not a violent stretch of the imagination to conceive of the political system continuing to function as a political system even though nuclear weapons are held by 15, 20, or even 50 nations. It strains my imagination, I must say.

I should think that the risks of psychopathy alone in such a system—to say nothing of miscalculation—would be almost intolerable;

that is, the fear that there would be one leader somewhere in a nuclear weapon state who would be so neurotic or so unbalanced as to be capable of launching a nuclear attack.

We are all familiar with situations of conflict involving violent passions which have occurred from time to time in the past and indeed which are going on now. The idea of adding a nuclear element to the passions involved in such conflicts seems to me a most unattractive one.

I will continue to support the nonproliferation treaty line as long as it is viable, Mr. Chairman.

Mr. WILLRICH. I have already declared myself in favor of the nonproliferation treaty, Mr. Chairman. I think that if you look toward the future and try to project, you don't project with any degree of certainty. I think the best thing you can do is to try to isolate, perhaps, the key factors that would influence U.S. foreign policy, if you moved in the direction of a proliferating world.

One of those factors, it seems to me, is the precise conflict relationships into which nuclear weapons are introduced. For example, the acquisition of nuclear weapons by India would be a quite different thing from the acquisition of nuclear weapons by Israel.

If you take the Israeli scenario, it seems quite foreseeable to me that if Israel acquired nuclear weapons, the United Arab Republic would not acquire nuclear weapons immediately of their own, but it would draw the Soviets into a dangerous situation in the Middle East where they would be required to back the Arab States with some form of perhaps even deployment of a nuclear deterrent force in the Middle East.

This, in turn, would draw the United States into a most difficult posture.

Secondly, you have to look at the structure of the postures that these countries develop as they acquire nuclear weapons. They will start out probably with a first-strike capability. Is that capability going to be aimed against another nuclear weapons state, or is it going to be aimed against a non-nuclear-weapons state? If so, does the non-nuclear-weapons state have conventional superiority, basically, against the country which has acquired nuclear weapons?

I would say that is a very important consideration.

Thirdly, I think you have to look at the structure of the government of the country which acquires nuclear weapons. One of my concerns with proliferation is that, although it may be a little parochial to feel that we are responsible with our nuclear power, I don't believe that that is particularly an issue.

But there is a certain amount of stability in terms of changes of government which thus far has stood us in good stead in terms of our domestic policies. But if you look at possible candidates for nuclear weapons, what sort of impact would the possession of nuclear weapons have on the succession, the succession to power, of succeeding governments within that country?

That could be, in itself, a very dangerous form of instability which would reflect itself in the international system.

Mr. ZABLOCKI. Your responses prompt another question.

Do you gentlemen see a contradiction between the assurances given to the Senate that the nuclear guarantees given under the non-

proliferation treaty do not entail any new commitments and our efforts to persuade our allies that the commitments are credible?

There is some question about it. What is your opinion?

Mr. WILLRICH. You are asking me first?

Mr. ZABLOCKI. Yes.

Mr. WILLRICH. Mr. Chairman, this is a very difficult problem.

The administration in presenting the treaty was faced with a very difficult problem in terms of how you could structure a system of some kind of assurance to non-nuclear-weapons states that if they were threatened we would back them up on the one hand, and on the other hand the fact that you, in my judgment, never would have gotten ratification of the nonproliferation treaty had there been built into the treaty some sort of system of guarantees.

I just think that that would have killed the treaty.

Mr. ZABLOCKI. So you do see some contradiction?

Mr. WILLRICH. I would say that there are in most important areas of foreign policy contradictory elements, and that if you refrain from pursuing one foreign policy line because of the contradictions in that line, that you would end up having no foreign policy.

So, while I see possible contradictions, the contradictions that I see do not offset the fact that, on balance, the treaty plus the Security Council resolution was and is a good thing.

Mr. ZABLOCKI. In other words, you maintain that there have to be a few "if's"?

Mr. WILLRICH. In any foreign policy.

Mr. ZABLOCKI. Mr. Rostow?

Dr. ROSTOW. I want to disassociate myself from part of what Professor Willrich said.

My opening statement indicated that the nonproliferation treaty has some implications, that it does in part increase pressures for dependence on the United States on the part of governments we are trying to persuade to sign the treaty. I don't think those pressures amount to a guarantee. It is a recognition, I should say, of the fact that political pressure may arise, political pressure to which we would have to respond in the nature of the case.

That is why I said that to me the nonproliferation treaty is meaningful only if it helps to lead to a political understanding between ourselves and the Soviet Union, a much deeper and more effective and pervasive understanding that has yet prevailed. Without that understanding, I can see the pressure of nuclear blackmail, the pressure of policies based on the emanations of the nuclear arsenal, become an intolerable strain to the system of politics and system of peace we have been trying to create.

I don't think that means that the United States would have a commitment, like a treaty commitment, to a nation like India, for example, if it signed the treaty, but I think we should frankly recognize that the political pressure arising from the existence of the nonproliferation treaty in the event of nuclear blackmail, or what is generally called blackmail, is a reality which will have to be faced, not a new commitment, not a new generalization of our obligations, but a new form of those obligations.

I agree with most of what Mr. Willrich said on the subject, but I want to disassociate myself from what he seemed to suggest, namely that if the problem had been faced frankly, the nonproliferation

treaty could never have been confirmed. I think the problem was faced frankly for what it is.

I recall some of the testimony which Mr. Rusk gave on the issue. I haven't read what Secretary Rogers said, but I gather it was pretty much along the same line. I think that was realistic testimony. No attempt was made in our thinking or in our public presentations to disguise the fact that if India signed this treaty certain consequences would follow for the nuclear powers if India were exposed to great pressure from China. That is true, in any event.

Mr. WILLRICH. Let me just respond by saying that I completely agree with Professor Rostow, that there was no lack of candor on anybody's part. I think everybody understood what people were saying, and why they were saying it.

I might turn it around.

One of the hopes that I have for the nonproliferation treaty is this, and often I think we look at it just from our perspective and it is not just our treaty by any means—one of the hopes I have, and actually it is going to be a necessity if the treaty is going to work, is if the Soviet Union is going to take a new look, a hard, long look, at its long-term foreign policy toward West Germany. If the Soviet Union continues to blast away with charges of militarism at the West German Government, I would say that this sort of foreign policy on their part is going to be rather glaringly inconsistent with the successful implementation of the nonproliferation treaty.

There are some real pluses here in those terms in the way of creating the kind of political climate where you might make some progress. Here is one case where you set up some international law and perhaps it opens up some horizons for broader political progress on some of these problems that have been bothering us ever since the end of World War II.

Mr. ZABLOCKI. Thank you.

Mr. Fraser.

Mr. FRASER. Thank you, Mr. Chairman.

Dr. Rostow, I was interested in your discussion of the differences between the emerging, new school of isolationism and your own view. I think some people might formulate the differences in a somewhat different fashion.

I want to put this to you to see what your reaction is. There are some, I think, who feel that one of the problems with U.S. policies is that the United States is too up-tight about the world, that it feels its interests are caught up in crises that may break out in Africa, Latin America, or Asia. It isn't so much a question of our concern about the emergence of an international community and of our obvious interest in having that be compatible with our values. It is that we are overreacting, that we see our security interests threatened where we really don't have any, at least in any foreseeable period of time.

That is what the argument is about. It is not that we don't have a concern about the world, but that we are too up-tight in terms of seeing our vital security interests threatened by events everywhere.

What do you have to say about that?

Dr. ROSTOW. I said earlier I distinguished at least three schools among the critics of the foreign policy which the United States has

pursued for the last 20 years. One, as you say, feels that we are overcommitted, or, at least, overreacting. But I never can find in that literature a definition of what constitutes overreaction, and how to distinguish it from a proper protection of our interests.

Mr. FRASER. I suppose for that school the intervention in Vietnam would be an illustration?

Dr. ROSTOW. Nobody has ever answered to my satisfaction how one U.S. administration can ignore a treaty made by another and ratified by the Senate.

Mr. FRASER. You don't mean SEATO?

Dr. ROSTOW. I do mean SEATO.

Mr. FRASER. I suppose we could do the same thing that Britain and France did, who were signatories.

Dr. ROSTOW. Yes, but they had us behind them. What security is there in the world if an American treaty loses its deterrent power?

Mr. FRASER. Do you feel the British and French broke a treaty obligation in failing to come to the aid of South Vietnam?

Dr. ROSTOW. Yes.

Mr. FRASER. I have never understood the SEATO Treaty to require them to do that.

Dr. ROSTOW. It is a different problem for Britain and France, of course.

Mr. FRASER. I am talking about whether they broke a legal commitment, a formal treaty commitment.

Dr. ROSTOW. That is an arguable problem because the treaty, like all treaties, requires consultation and national action. But from the point of view of the United States, whatever security there is in the world, whatever stability there is in the political system we have been trying to construct, is based on the deterrent quality of American treaties.

Mr. FRASER. Leaving the formal question aside, there is the substantial question of whether we should have reacted to events in Vietnam.

Dr. ROSTOW. That is the difficulty I have, Congressman Fraser, in defining what is up-tight and what is overreacting.

Secretary Rusk said the other day that in the period of his tenure in office there were 88 episodes, I think he said, of force or violence in the world. But we were involved politically, or militarily only in six. That is hardly being trigger-happy.

It is not true, in my observation of American policy over the last 20 years, that we rush into every crisis like an eager fireman. Quite the contrary, I should say if you look back and see the mistakes that were made in the postwar period, perhaps one of the most fundamental was not moving earlier to insist on the implementation of the Potsdam and Yalta agreements.

If we had reacted in 1948 when the first takeover of Czechoslovakia occurred, a great deal might have been saved thereafter. So, if you try to learn from hindsight, I don't think you get the picture, or I don't get the picture, of the United States rushing in too up-tight whenever there is trouble.

Mr. FRASER. Let me give you specific illustrations besides Vietnam: the efforts of the United States to sponsor or facilitate a coup in Guatemala in 1958; and, our intervention in the Dominican Republic. All our interventions are not military, but the point is that we have

these physical instruments of power, tanks and planes, as well as other elements of U.S. presence that influence events both overtly and covertly.

The question is, are our security interests that tightly wrapped up in these events so that we need to respond at all, either at the military level or in some other appropriate fashion?

Dr. ROSTOW. Sometimes. I think the exercise is worth undertaking, at least as I see it, to find what our security interest in the world is, and to help the country reach agreement on it.

Mr. FRASER. That is the question at the heart of it, I think.

Dr. ROSTOW. I agree, that is the heart of the matter. That is why I think it is important to decide whether we can accept definition A, B or C of the purpose of our foreign policy as our major premise.

In my prepared statement, I suggested that the goal of our foreign policy is to protect the security of the United States by helping to build a new system of peace, based on a balance of power, and an acceptance of certain rules of live-and-let-live, in this respect. I want to associate myself with the formulation Senator Fulbright has made, not that I always agree with Senator Fulbright with its application. But I think it is useful to distinguish this definition of the goal of our foreign policy, which I think is rational and realistic, from those definitions which would associate foreign policy only with helping good guys and hurting bad guys, and so on.

In those terms, I should agree with what Senator Fulbright said at the time about the Dominican Republic affair, that if he had the same information that President Johnson had, he would have done exactly the same thing, because there the problem facing the President in terms of the information which he had was a spread of Castroism in the area.

You are dealing here with something of immediate concern to the United States, and a subject to which we were very sensitive, perhaps irrationally sensitive but passionately sensitive, nonetheless.

About Guatemala, I don't know. I never studied that episode. It happened long before I got into government and I have no real opinion one way or the other. I would say, looking back at my own experience, the strongest regret I have about my term in office is that we didn't act in time to head off the Middle Eastern war. Maybe we couldn't have.

Mr. FRASER. Which one?

Dr. ROSTOW. In 1967.

Mr. FRASER. What I am trying to get at is that a lot of people see this as a world in which there are strong pressures for change. Change is not a neat and orderly process. It can be damaging to the people involved, depending on how it takes place.

The question with regard to each change is, to what extent are our interests caught up in it? The relationships established in the Alliance for Progress, or through the OAS, for example, embrace the idea, though we deny it, that Latin America is primarily reserved for us. It is kind of an extension of the Monroe Doctrine. We find ourselves caught in this dilemma in Peru.

We have a feeling that American power, American presence, values, and ideas ought to prevail rather broadly, and our whole approach to these relationships tends to show that.

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Dr. ROSTOW. I agree that is a common view of American foreign policy and the purpose of our activities around the world, but it is not mine.

I think it is always misleading when a discussion is conducted in those terms. Yes; the process of change is very turbulent, and certainly wherever the United States is involved, wherever the United States has an aid program or a strong military presence in a country, our influence, in my experience, is invariably on the side of change and progress, progress toward democracy where it is possible, and so on.

I think one of the most misguided criticisms of our foreign policy is that we are in favor of the status quo, or of reactionary governments. You referred to the controversy with Peru. I happen to know a little about that controversy, about the nationalization of the IPC. It is a long, complex legal argument that goes back over I don't know how many years—50 years at least. It involves the status of an international arbitration award and all kinds of complex problems. We worked very hard with the company and with the government of President Belaunde, then the President of Peru, a very progressive forward-looking President, to reach a settlement that would be satisfactory from the point of view of the Peruvian Government and satisfy the criteria of international law, which requires compensation where property is nationalized.

The President of Peru was then thrown out by a military coup d'etat, and a government of military officers came in and sought to attract nationalist support by revoking the agreement President Belaunde had made.

The problem remains the same. There is no use throwing blame around. What happened is very clear. In this case, we were not opposing, but actively helping, a government that favored the processes of peaceful and active change. But the problem has now been complicated simply by the intervention of chauvinism that can readily be understood.

Mr. FRASER. I am not trying to assess blame. But it is apparent that in Latin America we really get tough, we are ready to cut off aid, take away the sugar quota and so on, when there is an expropriation without arrangement for compensation. But when political liberties are destroyed, when military juntas take over, we find this quite compatible—in Greece, in Panama, and I gather to some extent in Peru, at least until the April deadline.

This suggests that we have a very strong interest limited to the economic area. We seem prepared to exert it to the detriment of the people involved.

Dr. ROSTOW. That is why I wanted to try to direct attention to the problem of defining the purpose of our foreign policy. The writ of the United States doesn't run very far. It doesn't run very well inside the United States, and it doesn't run outside the United States at all.

Of course, the United States is opposed to dictatorships, military or otherwise, but we have interests and our foreign policy should be addressed to those interests.

Mr. FRASER. That is where I think we have the problem.

Dr. ROSTOW. But we supported Stalin against Hitler, and I thought that was a correct decision in that respect.

Our problem is not to pick people whom we like, because governments come and go, and we have little or no influence in selecting them, anywhere. We have an abiding interest in the independence of Greece, and sympathy for Greece's political troubles, whatever government may be in power.

Mr. FRASER. And you proceed to give military aid to the junta that is running it.

Dr. ROSTOW. The situation in the Eastern Mediterranean is not a very happy one.

Mr. FRASER. Mr. Chairman, I appreciate the time.

I think the problem cannot be dealt with in specifics. One has to look at how we best relate to the world. I find it enormously difficult to establish any real communication on this score. Obviously, I agree with those whose case I was trying to state. The issue is: Where are our real interests? What country today is really prepared to injure the United States or has the capacity to do so, other than the Soviet Union? It is very hard to imagine. We have a nuclear deterrent that costs $8 to $10 billion a year. What is the other $70 billion of our defense budget being spent for? Obviously for some very important things. But what other country can injure the United States? That country doesn't exist today in any important way.

But excessive military spending is only the beginning of the story; it is not the end of it. If we could become less up-tight and more sensitive to the aspirations of people in a manner consistent with our own traditions, we might find our worldwide position much stronger in terms of how other people view us and in terms of our effectiveness.

Dr. ROSTOW. Congressman, let me try my hand at an answer. I am greatly concerned at the absence of serious dialog on foreign policy and I want to devote all the effort I can to improving it.

As I said in my opening statement, as I have been trying to say elsewhere, about the conduct of a rational and sober exploration of these intensely difficult problems based on mutual respect, I think if we stick to a major premise on which we do agree, we ought to be able at least to discover where we do in fact disagree. Let me take a good illustration, I think, of a very acute problem which does affect our interests; namely, the Middle East.

We have enormous national interests in the Middle East, historical interests, interests in resources, interests in the defense of Europe, interests arising from the history of Israel and so on. The Middle East is an area in which the nuclear threat so far is not obvious, but in which all kinds of consequences for American interests and for the possibility of a system of peace are involved.

A complete abandonment of the positions we have taken in the Middle East could result in the paralysis of Europe, the outflanking of Europe and the establishment of hostile access to the Persian Gulf and Africa which could be very threatening.

The Middle East is an area in which the nuclear weapon is of no use, in which a combination of political and military intervention, hints, threats and negotiations are indispensable. It is a long, difficult effort of the kind which has become characteristic of our diplomacy since the war.

You asked for a place in which American interests could be threatened, could be altered, and there is one. The Soviet Union has cer-

tainly been an active participant in the campaigns of the United Arab Republic and other Arab States, but it is not a prime mover, directly.

Mr. FRASER. The Middle East does not threaten the United States in any immediate sense.

Dr. ROSTOW. They threaten our position in Europe and the independence of Europe.

Mr. FRASER. The independence of Europe and our position in Europe are two different subjects.

Dr. ROSTOW. I meant them to be the same in the sense that we have a national interest in the independence of Europe.

Mr. FRASER. I agree with that.

Mr. ZABLOCKI. Professor Willrich.

Mr. WILLRICH. Just in terms of the dialog here, I am intrigued, let me say that. It is a central problem, it seems to me.

One of the things that I have been impressed with is the fact that it is much easier to talk about national interests before a crisis arises than during a crisis in terms of actually defining what you are going to do, and in terms of foreign policy line it is much easier to conceptualize now, in a hearing room or in the executive branch. But when the real crunch comes and you have to make a decision on something and it is going to have irreversible consequences, then it is much harder to make that decision based really on the abstract principles. You have to carry something in with you.

I really have trouble with the notion that the United States should only be involved in things where it might be directly threatened if it were involved. I think this is the kind of isolationism which, if you retreat into, we would find ourselves directly threatened by many more things. But, beyond that, it seems to me that we are necessarily economically involved in, for example, the Latin American countries. If you look at the history of the oil companies' involvement there and the governments' responses, there are interesting parallels between Argentina, I think, and Peru in that regard.

But the oil companies are not all bad on the one hand and the governments there are not all good on the other. I would say a substantial part of the foreign policy that sort of guides our response down there has really been set by the Congress in terms of, for example, the Hickenlooper amendment. They talk about an inflexible foreign policy, or one where we are forced to take action on the basis of something which might be against our interest. The Hickenlooper amendment triggers this sort of automatic response.

Mr. FRASER. That is an attempt to protect our economic investments abroad. I think of it as a two-edged sword which can come back and injure U.S. interests.

You say the Congress set our response, and that is right in this one case. But the speeches put out by the State Department refer to the free world as something that exists in reality. That is not a helpful way to conceptualize the problem.

You state that the basic American doctrines today have to be directed against the continuing basic Communist ambitions. My own conception of the world is somewhat different. It isn't so much a question of whether we should be involved. The issue is whether we should be involved because we think we have a security interest or whether we should be involved because we are concerned about the

growth and emergence of societies with whom we can be neighbors in the long run. There is quite a difference in the approach, I think.

One test I use now when I think about foreign policy is how would I feel about American policy if I were a democrat with a small "d," one who believed basically in our Western values. How would I feel about American policy if I were a Greek? How would I feel if I lived in Argentina? I find quite a discrepancy between the declared U.S. policy and how I would feel about that policy if I lived in some of these countries.

I am prepared to be practical where American vital interests are concerned, and obviously we have some. There is a dialog and conceptual framework that has been born of the past that is at the roots, I think, of the ongoing foreign policy debate in the United States. I am sorry that the debate isn't recast in terms that would permit of some resolution, rather than simply swing the pendulum, as is now taking place.

Dr. ROSTOW. It has to be a continuing dialog and a sober dialog. That is the reason why I am trying so hard to address more issues which I think are central. I can't, myself, imagine the President of the United States or the Congress of the United States being justified in authorizing the use of force, of sending our military forces abroad where people will get killed, except in defense of the vital interests of the United States.

I have tried to define those interests as an interest in helping to create a system of peace that would replace the old system that had vanished, for better or for worse, about 1945.

Mr. FRASER. Isn't that stretching the term "vital"? To you, "vital interest" means an orderly worldwide system.

Dr. ROSTOW. It is very hard to imagine our continuing to live as a democracy unless we live in a world with horizons at least as broad as those we now know.

To me, the argument about whether we are supporting progressive forces and the forces of social change and development come second. That is to say, our assistance to such processes of change is a consequence of the establishment of a system of peace, not the cause for our intervention.

If we help establish the bulwarks of peace, then we can see progress being made, as is the case in Iran, in Mexico, and in many other countries. You can name dozens of nations where, after trial and error, people are finding the way toward social progress and economic development. But the appeal of progress is not the cause of our intervention. It is the consequence of creating a system within which these countries can live in some security.

Mr. FRASER. I am sorry, Mr. Chairman. I didn't mean to take this much time. There has been a quorum call.

Mr. ZABLOCKI. We realize we have reached the hour that, by agreement, the session should end. Nevertheless, there are two or three questions remaining which I have for you gentlemen. We would like to have your views on them.

Dr. Rostow, you referred to the blind suicidal course of isolationism. We wondered particularly if the thick ABM system were to be deployed, whether this would enhance isolation and turn attitudes toward a fortress for America.

We would like your comments and Professor Willrich's, on the ABM system, how it relates to our national security.

If you would prepare your answers for the record, we would certainly appreciate your views.

Further, we are interested in the reversion of Okinawa to Japan and how this relates to our foreign policy and our national security.

Another question we would like to have your views on is NATO—how it should be strengthened; how it relates and fits into the pattern of our future national security.

If you would supply these answers for the record, we would be delighted to have them.

(The following responses have been received from Dr. Eugene V. Rostow to questions by Chairman Zablocki:)

1. I agree with the view your letter attributes to Undersecretary Johnson, that the Okinawa reversion problem should not prove to be a major factor in our relations with Japan during the next few years. I believe that each country sympathetically understands the basic factors in the other's position. In my view, these positions can and should be accommodated through negotiation. Mutually acceptable solutions are entirely feasible, and I can see no reason why they cannot be achieved. Progress has already been made. More is needed in the near future, along the lines of several possible models, equally practicable for us.

2. I believe the first plank in a program for strengthening NATO should be the fullest possible use on our part of the procedures for improving and intensifying our methods of political consultation which were unanimously approved by the NATO Ministerial Meeting of December 1967. The Resolution passed at that time was based on a year-long study of the future tasks of NATO as a factor for durable world peace. The text of the Communique and its Annex, embodying these decisions, appear in the State Department Bulletin for January 8, 1968.

In brief, the December 1967 Resolution of the Council calls for a new and vigorous program of political action on the part of NATO with respect to the common interests of the Allies, both in Europe and outside of Europe. While keeping our defenses strong, it looks to initiatives on the part of NATO in the field of balanced and mutual force reductions in Europe, and other proposals for arms limitation; it set in motion both political and military programs addressed to security in the Mediterranean; and it recommends consultations on common problems outside the Treaty Area. The Resolution urged the nations to develop the NATO Council as an active forum for high-level consultations regularly involving ministers and officials from the capitals as well as the permanent representatives in Brussels. And it authorized consultations involving less than all the members, if some were particularly concerned about certain developments.

The first public step taken under this program was the proposal for discussions with the Soviet Union and the nations of Eastern Europe regarding force reductions in Europe, made in June 1968.

The dynamic and forward-looking approach embodied in these proposals will not succeed unless the United States affirmatively makes NATO consultations an active part of the decision-making process of our government on a host of problems vitally affecting alliance security. Such a policy might well involve the establishment of ad hoc groups meeting in Washington as well as Brussels, as part of the process of crisis management, when factors of time make such steps desirable.

In the area of advanced science—nuclear energy, space, and other areas of comparable magnitude—I should recommend a general policy of cooperative development involving ourselves, Canada, Europe, Japan, and Australia. Such an approach could improve our security, and deepen our present ties of alliance.

In the field of trade and economic policy, I believe the right forum for alliance consultation is the OECD. It should become a vital center for action-oriented discussions on a host of problems where concerted policy is vitally needed—the further reform of the monetary system; the consolidation of trade policy; and the development of more effective programs for assisting the L.D.C.s.

OECD is an organization with a strong Secretariat and a history of successful action going back to the days of the Marshall Plan. It should be a focal point of action in our strategy to strengthen and deepen our relations with the nations of Europe and the Far East.

3. The Chairman also asked for my views on the ABM controversy. I have been greatly concerned about the Soviet naval and missile threat to our deterrent. That threat has increased sharply and steadily since the Cuban missile crisis of 1962.

In this context, it seems to me essential to press for secure agreements that could limit and ultimately end the nuclear arms race, which has made the world a nightmare.

But the lunatic process of nuclear growth—the nuclear cancer, in fact—cannot be stopped unilaterally. Unilateral abstention on our part would be unthinkable, especially with respect to the new technologies embodied in the ABM. What ABM represents is the potentiality, perhaps even the possibility, of one side being able to stop the missiles of the other. Such a development on the Soviet side could lead to a far more fundamental diplomatic crisis than the Cuban affair of 1962.

I can see no reason why President Nixon's decision about ABMs should alter the prospects for a serious negotiation on arms limitation with the Soviet Union. As Secretary Rusk remarked recently, "We are willing to talk with the Russians while they are deploying ABMs. I have no doubt the Russians will talk to us if we do likewise."

Chairman Zablocki also asked whether the development of ABMs might strengthen isolationist sentiment in the United States, and help develop a Fortress America outlook. There is such a possibility, but not, I think, a major one at this time.

In this sphere, as in others, it will remain the task of leadership to lead public opinion. I have faith in the sense of reality of the American people, if their leaders are willing to risk unpopularity by telling the people the truth, no matter how unpleasant.

The nature of nuclear weapons, and their threat, has remitted politics and military pressure more and more to the realm of conventional action. I believe the protection of our security should necessarily rely on such policies, while maintaining the nuclear stalemate by other means. Since our security continues to depend, as I should argue, on establishing and maintaining a reasonably stable system of peace in the world, I cannot conclude that action on our part to sustain at least our present nuclear relation to the Soviet Union would alter the nature of our calculations. It certainly would not alter our interests.

(The following responses have been received from Mr. Mason Willrich to questions by Chairman Zablocki:)

1. Regarding the current discussion at the ENDC of a possible treaty to prevent various military installations on the seabed, I believe the issues have not yet been developed to the point where detailed comment by me would be possible. In general, I support U.S. efforts to explore this area with the Soviet Union and other nations with a view to possible future agreement on arms control measures applicable to the seabed.

2. Regarding the ABM, enclosed is a copy of my article "ABM and Arms Control" which was published in *International Affairs*. Although it is an analysis of the Sentinel system, it focuses on foreign policy considerations, and I believe is still a good assessment of the overall problem from this perspective. I would think it appropriate to have the article reprinted in the hearings as my views on the ABM problem.

Mr. ZABLOCKI. Again, gentlemen, thank you very much for your time and the excellent statements you have presented to the committee, and your answers to the various questions asked. They were very direct. We appreciate your coming here and giving us so much of your time.

Thank you very much.

The committee will stand in recess until Monday at 10 a.m.

(Whereupon, at 12:35 p.m., the subcommittee recessed, to reconvene at 10 a.m., Monday, March 24, 1969.)

STRATEGY AND SCIENCE: TOWARD A NATIONAL SECURITY POLICY FOR THE 1970'S

MONDAY, MARCH 24, 1969

House of Representatives,
Committee on Foreign Affairs,
Subcommittee on National Security Policy
and Scientific Developments,
Washington, D.C.

The subcommittee met at 10:15 a.m., in room 2255, Rayburn House Office Building, Hon. Clement J. Zablocki (chairman of the subcommittee) presiding.

Mr. Zablocki. The subcommittee will please come to order.

This is the fifth session of a series of hearings held by the subcommittee in its study of the effects of space and weapons developments on U.S. alliances and security commitments abroad.

Today also marks the final public session of this series.

The subcommittee will meet in executive session with the Under Secretary of State for Political Affairs, the Honorable U. Alexis Johnson, and the Assistant Secretary of Defense for International Security Affairs, the Honorable G. Warren Nutter.

Although the current hearings are ending, the subcommittee will continue its intense interest in the subjects which have been dealt with by our witnesses over the past days. Other witnesses may be called at a future date. Moreover, we intend to give more intensive study to a number of the problems and issues which have been discussed by the witnesses, and which are of particular interest to the subcommittee members, because of their importance for our foreign policy.

I also wish to note that Dr. Karl Kaysen, director of the Institute for Advanced Study at Princeton, N.J., will be unable to be with us today as previously announced.

At this time, I would also like to call attention to a written statement which has been provided to the subcommittee by Dr. Zbigniew Brzezinski of Columbia University. Although a trip to Europe prevented him from being with us during this session, he graciously provided and contributed a brief outline of his ideas to us. Copies of Dr. Brzezinski's statement may be found on the press table.

(The document referred to appears in the appendix, p. 263.)

Mr. Zablocki. As our witness today, we are privileged to have with us Prof. Vincent P. Rock. He is the executive secretary of the Committee on ACDA Support of Dissertation Research in the Social and Behavorial Sciences, National Academy of Sciences, former director

of the Center for Policy Studies in Science and Technology at George Washington University.

Professor Rock is author of the book "A Strategy for Interdependence."

We are very pleased to have you with us, Professor Rock.

Will you please begin?

STATEMENT OF VINCENT P. ROCK, EXECUTIVE SECRETARY, COMMITTEE ON ACDA SUPPORT OF DISSERTATION RESEARCH IN THE SOCIAL AND BEHAVIORAL SCIENCES, NATIONAL ACADEMY OF SCIENCES

Mr. ROCK. I have given the committee a written statement and, if I may, I will speak from that, rather than read it.

Mr. ZABLOCKI. The prepared written statement will be made part of the record at this point.

(The statement referred to follows:)

STATEMENT OF VINCENT P. ROCK, EXECUTIVE SECRETARY, COMMITTEE ON ACDA SUPPORT OF DISSERTATION RESEARCH IN THE SOCIAL AND BEHAVIORAL SCIENCES, NATIONAL ACADEMY OF SCIENCES, BEFORE THE SUBCOMMITTEE ON NATIONAL SECURITY POLICY AND SCIENTIFIC DEVELOPMENTS, MARCH 24, 1969

TECHNOLOGICAL ADVANCES AND THE NON-TECHNOLOGICAL CONSEQUENCES

I. Introduction

One year out of two since 1940 has seen foreign military intervention by the United States. Is this a valid reflection of the state of the world? Or does it mirror the condition of American statecraft?

The state of the world, domestic or foreign, is scarcely a source of tranquility for most Americans. A growing number are skeptical about the condition of our statecraft. To assert that statesmen do not have the knowledge to deal with present conditions is not likely to be viewed as helpful. If nothing could be done about acquiring new knowledge and applying it to new tasks, the prospects would be dim. Fortunately, this is not the case.

Each day, problems that have persisted since the dawn of history are being resolved by the applications of new knowledge. Disease is being conquered by the cooperation of scientists, physicians, and the people who were formerly its victims. Nations maintain stable and growing economies through concerted action of government, business and labor. These achievements are based on new knowledge ever more widely diffused.

However, the blessings are not unmixed. The problem of aggression and intervention has also felt the impact of new knowledge. Unlike areas in which progress has been made, however, the weight of the effort has been on perfecting old instruments. It has not been on creating new knowledge of the cause and cure of conflict. It is as though medical science had continued to concentrate on ever more refined tools for bloodletting.

Weapons technology has also continued to advance. Today, the stability of the strategic military environment is threatened by new developments in both defensive and offensive weapons. The relative effectiveness of the complex new system is being debated. Even more uncertain is how adversaries will perceive and respond to the new system.

Significant changes in the capacity of general purpose forces are also underway. The speed with which armies may be deployed over great distances is growing. New concepts for the use of seabased power reduced the need for overseas land bases. By the 1970's an air force of the size employed in the Korean War will be able to drop conventional bombs equivalent to more than a hundred Hiroshima nuclear weapons in the course of a year. Any industrial nation can now be swiftly reduced to rubble with "conventional" means.

II. Transformations in the context of conflict

Advances in technology have significantly altered the context of conflict in two respects. Other than qualitatively new environments for hostility created with the advent of modern weapons systems, the revolution in communications technology, and the application of scientific invention to the problems of economic development have given rise to serious discontinuity in political relations.

To advances in communications systems can be traced the roots of much potential conflict. First, as physical distances between men and nations become less and less relevant, the psychological distance between them become more and more apparent. Not only are the "have not" nations learning what they can aspire to, the "have" nations are reluctantly forced into thinking through how they should relate to the "have nots." A major war has for the first time been fought in our living rooms with the profoundest domestic consequences. And people abroad witness our own internal strains and stresses and wonder if the United States is the "America" they have heard so much about.

Second, communications systems have sped up the processes of international politics by interconnecting conflict situations all over the world. The smallest event becomes global—witness the quite legitimate outrage over Biafra of Great Britain's own "Bay of Piglets" in Anguilla.

To the application of scientific invention to the problems of human welfare can be traced the roots of both hope and despair.

First, the power of modern science and technology have vastly increased the capacity of society. Productive capacity has also grown apace. Material goods in increasing volume become available. The movement from scarcity to abundance modifies a wide variety of human relationships. Children acquire new freedom of movement. Business is conducted on a larger scale than ever before. States develop new instruments with which to exercise power and influence. While the processes of modern society tend to converge, the capacities may for a time at least diverge. Discontinuities in culture and society arise. In those circumstances, the historical ties of experience may become less relevant. Differences in the perception of what is appropriate may multiply. Calculations of interest and power may grow more uncertain. Occasions of conflict may proliferate.

Second, the gap in productive capacity between the "have" and the "have not" nations is widening. While the growth rates in the less developed countries may be impressive, they refer tragically to a modest base. The declining death rate coupled with several bad crop years could lead to a famine on a scale that even bold remedial actions now could not adequately address.

The political consequences of these trends are many and varied. Given both the discontinuities in levels of development and the interdependence between international problems, there will be an ever-increasing proliferation of the causes for conflict. This is to be coupled with the declining ability of the super powers to influence events and induce social change.

As technology increases the capacity of nations, differences in political influence may be aggravated and made more salient. The problems of differential change are acute not only in developing nations but also in the advanced states. Black Americans, French Canadians, Soviet Tartars and young adults everywhere seek to modify national political practices. New gaps between government and their peoples are perceived. The impact of science-based technology is outstripping basic and applied knowledge of how to achieve evolutionary political growth.

In the next decade we will witness the gradual growth of at least five great centers of influence. A pentagonal world including Europe, Japan and China as well as the superpowers presents special problems and opportunities. An evolution in political outlook will be required to maintain U.S. influence.

In Europe, the appearance and reality of American dominance will have to be reduced. Among European elites and masses there is a slowly growing commitment to integration. At the same time, the desire to be politically independent of the superpowers continues to mount. The prime task is to facilitate steps toward political integration and a sense of psychological independence within the context of a larger world community.

The tight managerial arrangements erected for the conduct of a military alliance will have to give way to a more flexible though no less significant set of political relationships between Europe and the United States. At the same time, there will be needed procedures which encourage both expansion and equality in U.S.-European private relations in a variety of fields such as science, education, and enterprise:

In Eastern Europe, measures are needed to lower the level of both the anxiety and the concern of the Soviet Union. In its own interest as well as Europe's it must be induced to abandon the policy of intervention. Small-scale experiments in denuclearization or demilitarization could conceivably make a contribution. Progress in Soviet-American political and economic relations would also be helpful.

Turning to the Far East, one finds that Japan is moving into the front rank of industrial nations just behind the superpowers. Again there is a rising desire for independence. The discussion of the status of Okinawa is but one indication of a more general drift. New means will have to be designed to maintain U.S. influence. In the years ahead Japan is certain to play a larger role in the western Pacific. Continued cultivation of mutual interests in the area is essential.

Beyond Japan lies China. In the case of China the central task is to identify and design steps which will lead to her reentry into the community of nations.

In addition to the five great centers of influence, there are, of course, more than a hundred other states in the world. Development of functional and political regional groupings for many of these appears essential to strengthen stability. Latin America and Africa could in particular profit from stronger regional arrangements. The task will not be easy. A serious American commitment to the objective will be necessary to success. The manner in which the United States can most effectively facilitate the process is itself a complex problem not yet adequately understood.

The context of conflict is at once personal, social and technological. Conflict cannot be eliminated but it may be transformed. The transformation may result in either destructive or constructive outcomes for all concerned. The challenge to politicial leadership in all nations is to redirect the energies now devoted to destructive conflict, actual or potential, toward constructive goals and objectives.

A process of individual and national differentiation is associated with the growing capacity. The differentiation complicates accurate perception and calculation of interest. In these circumstances, new political processes and structures are essential. They are needed to regulate destructive tendencies in the international environment. They are also essential to facilitate the sustained growth of the constructive capacities of nations.

In sum, there is a need to transform the basis relationships on common interest. Men will differ on the prospects of success in this endeavor. Still, does the destructive potential generated by science and technology leave an alternative? Fortunately, science may help to point the way and technology may provide new means for reducing the deep divisions of mankind.

III. Commitment to political development

We Americans are a problem-solving people. This has been our genius. We have an impeccable faith in the "solvability" of a problem. We are accustomed to devising new methods and techniques and given our abundance, we have usually been able to bring it off.

However, the Yankee ingenuity that has made us what we are has been essentially technological and our very successes in technology have debiliated our nontechnological inventiveness.

Our deep involvement with machines and things has nurtured in us an instrumental view of the world. For not only are problems solved, they are solvable through the creation of devices of one form or another.

Instrumental action embodies a perception of reality which tends to place man in a category with things. At the level of the individual, it is embodied in the concept of one man doing another's will. In society it is reflected in the value placed on production as contrasted with participation, in imagery of man as part of a machine. In the polity, it calls for a person to place the value of the state above the life of the individual. Instrumental action need not involve the coercion or manipulation of the individual, it may merely imply that he is used—for purposes external to his own. When tools are simple and their capacity limited, the impact of an instrumental view of man was limited. Today the problem has been transformed.

While technologic responses to technologic change may be necessary, they are unlikely to be sufficient. Needed is a new kind of instrumental prospective that is not delimited by techniques and gadgets, but that is innovated by the urgency of the need of new strategies and techniques designed to handle conflict in the ways which produce a constructive outlook for all.

In sum, the context of conflict calls first and most urgently for a commitment to political development to cope with the problems of a technological—civilization. The meaningful options are not to be found among military weapons systems. There the choices are technical and temporary. The critical decision is between investment in political development and investment in military development.

Political development to enchance the probability of constructive outcomes includes three main elements. First, superordinate goals toward which all mankind can strive are—vital. Second, operational objectives for political development by area and issue must be devised and given meaning in action. Third, a new methodology is essential. In a global technological civilization, intuition even when girded with a mass of information is no longer an adequate foundation for foreign policy.

IV. Superordinate goals

As the historical diversity of the peoples of the globe becomes more apparent, the necessity of superordinate goals toward which all may strive becomes more urgent. The task is subtle and illusive. Superordinate goals must not only reflect a basic and widespread need. They must be expressed in symbols which resonate with widely different historical and individual experiences. In their elaboration the utmost care ought to be taken to link the common elements of a variety of interests with the attainment of the superordinate goals. Political leaders in any society are, of course, forever engaged in this task. They would profit from a systematic science of value on which they could draw. Even in the absence of such systematic knowledge, it may be possible to identify certain transnational superordinate goals.

A. *Survival* of the society, in any rational perspective, would seem to be one such goal. A common interest in the stability of the military environment is a more limited way of expressing the goal. This formulation would seem to provide the basis for the progress made thus far in the relations of the United States and the Soviet Union. Moreover, the growing concern that local conflicts could lead to a nuclear confrontation provides an incentive for extending the concept of stability at least to certain aspects of a conventional armament. It is worth noting that the interest of the Chinese in this goal may increase as their productive capacity increases.

B. *Material abundance* may be a second superordinate goal. At least it appears to be an objective of the governments of all nations, or at least all advanced nations. They continue to seek ways to improve the level of living of their people. While methods vary a good deal in concept and effectiveness, all advanced governments seek to expand education and production as well as to facilitate the cooperation necessary for improvement. All are still only partially successful. A common technological environment is, however, being created. This in turn helps to facilitate common perceptions of problems and opportunities. The process has long been a familiar one in the scientific communities of the world.

Therefore, it should be no surprise to find that a leading Soviet physicist, Andrei D. Sakharov, has set forth an imaginative and realistic framework within which the Soviet Union and the United States could work together to achieve a viable world. The world he envisages is not only one of material abundance but of intellectual freedom. It is also one in which there is relief from racial, political and economic exploitation. Dr. Sakharov's program has parallels in Europe and the United States. It warrants serious consideration and a measured response from Americans who share his hope and confidence.

C. *Equality* is a third possible superordinate goal. In the long run, it may be the cost compelling as well as the most exciting. In the short run, of course, the drive for equality both complicates and lends urgency to the tasks of political development.

The goal is human equality. Its meanings are a multitude, but still not as numerous as those who would repair to its banner in capitalist and socialist countries alike. Until the present age, equality has often been a dangerous and illusory ideal. Men lacked the means to give it substance. Now for the first time affluent societies have been created capable of fully satisfying their basic material needs. Global communication makes this achievement visible to all. Moving from different contexts virtually all men seek to share in it.

At the same time the deployment of technology from which the achievement stems gives rise to new problems of common interest to all states, advanced and developing alike. Together they face the problems of population growth, of environmental pollution, of urban concentrations and indeed of the tension between bureaucracy and continued creativity.

V. Operational objectives

Political development is a way of maintaining order while coping with change. It is a politico-psychological process which has related economic and military aspects. The hazards the U.S. now faces are as much political as military. While all around the world has been changing, there has been inadequate political development of the alliance structure. The Soviet Union may be in an even more precarious position in this regard.

The objectives of political development are several. A primary aim is to provide a context in which conflict can be handled in a way which will produce constructive outcomes. In an armed world the purpose may be simply to avoid or limit the destruction that could be associated with conflict. It may simply be a minimal response to changes induced by technological advance. Some forms of political development are, of course, essential to obtain the benefits of modern technology. Finally, it may be necessary to cope with the indirect and undesired effects of technology.

An exhaustive list of the gaps in political development would be long indeed. It would include the need for:

(1) Comprehensive arrangements with the Soviet Union for the control and limitation of nuclear weapons.

(2) A great variety of procedures and understandings to guard against escalation of conventional conflict in different areas of the world.

(3) A systematic strategy and set of tactical instruments to influence Europe's long-run movement toward integration and independence.

(4) Experimentation with concepts and means to induce the Soviet Union to give up intervention in Eastern Europe.

(5) New measures for strengthening regional groupings.

(6) Plans for demilitarization of the U.S. political interest in Southeast Asia.

(7) Design and testing of programs for the achievement of political, economic and military viability of one or more Asian states without U.S. military intervention.

Political development is more demanding than weapons development. Large-scale research, development, experimentation and evaluation are all essential. A conscious search-and-sort of values which may relate to superordinate goals is necessary. Systematic effort to create concepts and processes which provide a constructive outcome for conflict is essential. Performance criteria are needed to guide the control of nuclear weapons, the integration of Europe, the improvement of the level of living in less-developed countries and other similar objectives. Feasibility studies from a multiplicity of perspectives, novel as well as traditional, ought to be undertaken. New knowledge must be sought through fundamental and applied behavioral research. Design of new institutions and processes need to be initiated. Experimental models of action can be tried out and evaluated. New systems of relationships can be gradually brought into being and modified in response to feedback from those affected.

VI. Political development a reciprocal process

Political development is impeded by an instrumental view of man. Experience and learning always require transactions with the environment. Therefore, if political development is to occur, there must always be reciprocal activity on the part of all those involved. The goal of systematic large-scale investment in political development is to design and implement courses of action or programs which will involve others in ways that lead to preferred changes in attitudes and relationships. Reciprocity must necessarily be based on some degree of mutuality of interests and cooperative action.

Policy decisions based on a reciprocal rather than instrumental view of the problem are in this perspective the critical levers of change and control available to statesmen. Machines are useful only when they help to achieve a constructive outcome.

Reciprocity as a principle of action cannot prevent conflict. It does enhance the probability of a constructive rather than destructive outcome. First, however, there is a major task of creating and organizing the relevant knowledge and techniques just as in the case of a weapons system. Before a problem can be solved by new knowledge, it must be conceptualized in an appropriate way. The conceptualization should meet several criteria. First, it should enlist a commitment to systematic verification both by enquiring minds and by the patrons who control the resources essential for success. Second, it should permit independent

experimentation and verification in part or in whole. Third, it should encompass all factors relevant to the resolution of the problem while excluding those not essential to that goal. Knowledge of oneself and one's side is a requisite, but it is far from sufficient. Knowledge of others, ally and adversary alike, is also essential. In a sense, reciprocal action may be derided as a council of perfection. Yet, the alternative is to presume that it is beyond our capability to create international systems in which the mutual advantages will be preferred to destructive conflict. To doubt that it is possible, is to call into question every community now in existence. None have been entirely successful, but all have demonstrated the possibility of progress. Individually, their progress is increasingly dependent on systematic information and knowledge.

VII. An American initiative

Pragmatic Americans are unlikely to elaborate a coherent scheme for the resolution of conflict. They are more likely to select some concrete objective and move forthwith to ad hoc implementation on a relatively random basis. The approach is not without value. It does have certain hazards. Oversimplification at the outset may contribute to an exaggerated expectation of short-run gains. Action may be taken which would be constrained by a more systematic theory and analysis. Pragmatic action may also fail because complementary steps called for by the concept of reciprocal action are not perceived as important. On the other hand, small actions conceived with a keen appreciation of the concept of reciprocity may achieve little because they lack salience in an ocean of instrumental actions. Negative coherence can be as effective in obscuring one's own constructive reciprocal actions as those of an adversary.

Should the United States decide that experimentation with mutually rewarding action for political development is worth the investment of additional resources, the associated research, development and experimentation activities in addition to the information function need a special institutional home in both the Executive Branch and Congress.

The initial purposes to be served by the R.D. and E. might include the following:

First, examine proposed and actual instrumental actions to evaluate their comparative potential when modified and taken in a reciprocal context. Analysis of this kind would help to highlight the gains or losses which stem from instrumental acts.

Second, encourage and support the most talented scholars who can be recruited for the purpose of developing a general theory of conflict and the political development necessary to achieve constructive outcomes. The implications for policy of such a theory might be comparable with the general theories of Keynes in economics or Einstein in physics.

Third, encourage, support, and collate research designed to broaden and deepen understanding of the main factors involved in conflict and political development. This could include research in such areas as: (A) Aggression and achievement in animals, men and nations; (B) Indentity development and role implications of world leaders and key elites; (C) Attitudes, aspirations and capabilities of the various peoples of the world; (D) Cultural norms and styles which aid or impede reciprocal relations; (E) Behavior concomitants of changes in the level and composition of the political economy of states; (F) Evaluation of the sense of community or diversity of societies; (G) Relations of political structure, social situation and modes of political participation; (H) Experimentation with strategies, tactics and techniques of reciprocal action and their evaluation.

Fourth, act as an exponent of the concept of reciprocal action and as the advocate of specific reciprocal action policy intiatives within the Executive Branch and with Congress.

Fifth, prepare an annual progress report for the President and Congress on the following: (A) The state of fundamental knowledge relevant to political development and the control of conflict; (B) The application of knowledge relevant to the main facets of the problem; (C) Developments in the design and deployment of reciprocal action programs.

VIII. Location of responsibilities for political development research, development and experimentation

The conventional response to the foregoing suggestions is predictably of two kinds. One group of people will be unable to see any reason whatsoever to undertake the effort. They are caught in a traditional mold of thinking and are unable

to relate to new concepts until time has given them a conventional glaze. This group can be bypassed in the certain knowledge that as the idea gains currency they will come to accept it. A second group may see validity in the ideas, but institutional interest will lead them to oppose the ideas in part or in whole. Among the second group, efforts to suppress or fragment the central concept must be resisted. On the other hand, their tendency to adopt aspects of it is to be encouraged. Later they may be useful allies.

In the end, however, acceptance of the idea will depend on finding support among a third group. These are creative and entrepreneurial individuals to be found in Congress, in private enterprise and in the universities. The feasibility of the institutionalization of reciprocal action may depend on working out acceptable control arrangements with members of Congress who, though not actively opposed, may not be positively in favor of the innovation. These and other related considerations may tip the scales in favor of one Executive Branch location as against another. In any event, the alternative locations for the new activity must be carefully assessed with full regard for the interests and attitudes in Congress.

One possible location for the new activity is in the U.S. Arms Control and Disarmament Agency. There are, however, certain disadvantages. First, the basic concept of A.C.D.A. has a negative connotation. Control implies regulation. Disarmament implies a reduction in the activity of powerful institutions. Moreover, in the past A.C.D.A.'s interpretation of its mission has in the main been rather narrow. Heavy emphasis has been placed on the negotiations of formal agreements. Since, at the outset, A.C.D.A. was deeply concerned with political symbolism, with countering the propaganda of the adversary, the emphasis is understandable. The negotiations progress to date has been useful and the effort must be continued.

Nevertheless, the stress on negotiations has important indirect effects on the performance of the agency. Negotiation is the basic responsibility of the Department of State. Defining A.C.D.A.'s primary job as one of negotiating agreements has involved the agency ever more deeply with State. Since anything may affect negotiations, State has acquired a voice, if not a veto, in the A.C.D.A. research program and its action implications. Unfortunately, State is scarcely more comfortable with research and development than it is with action programs. It has engaged in as little of each as possible. The thought of systematically setting out to acquire the fundamental and applied knowledge necessary to resolve a chronic problem runs contrary to the sense of historical determinism which has pervaded much of the Department. Historical determinism encourages valuable humility when seeking to influence events. However, there is also a need for positive approaches which favor innovation and experimentation. In order to succeed they require a certain freedom from the burden of tradition.

A.C.D.A. has, of course, been able to develop the concept that research on the environment, one suitable for arms control, is a legitimate aspect of its mission. Still, the idea that A.C.D.A. should actively seek to strengthen the capacity of fundamental and applied science to understand that environment is only now being addressed. The thought that the agency should exercise active leadership in creation of a suitable environment would represent a significant extension of past thinking and effort. To provide bold and effective leadership for research, development and experimentation aimed at creating a reciprocally advantageous environment, A.C.D.A. would have to turn sharply away from the previous limited and negative interpretation of its mission.

By statute, of course, A.C.D.A. is an independent agency reporting to the President as well as to the Secretary of State. A.C.D.A. has the formal responsibility to seek to define its role in more positive terms and to demonstrate a greater appreciation of the breadth of the problems to be surmounted. If it were to respond to the challenge and manifest increased openness to innovation, A.C.D.A. would be a logical candidate for the new reciprocal action responsibilities.

A second alternative is to locate A.C.D.A. together with a number of other activities now in existence which are concerned with discrete aspects of action to control conflict in a new institution. Among these ativities are a number generated or supported by the Department of Defense. Many of these are deformed and impotent as a result of subordination in a weapons technology or conventional military milieu. Nevertheless, the resource scale and systematic planning approach employed in Defense would be useful in a new institution. On balance, the creation of an overt research, development and experimentation agency

concerned with the control of conflict, reciprocal action, and political development has much to commend it. Before a decision along this line is taken, detailed disussion of what the new agency should include and how it is to be created would be necessary.

A third alternative, a partial and for the present a theoretical one, would be to look to the National Social Science Foundation for research leadership when and if it comes into existence. The creation of the Foundation will, however, move according to its own tempo.

In a sense, the discussion of a precise location is premature. The potential of the new activities being suggested are comparable in their way to those of the Department of Defense. A reasonable period of gestation is to be expected.

In sum, let me state again that the critical choice for Congress and the administration, in my view, is not among weapons technologies, but between weapons development and political development.

Thank you.

(The biography of Mr. Rock follows:)

VINCENT P. ROCK

Vincent P. Rock, who specializes in national security policy systems, is a staff member of the Division of Behavioral Sciences of the National Academy of Sciences. He is Executive Secretary there of the Committee for Arms Control and Disarmament Agency Support of Dissertation Research in the Social and Behavioral Sciences. In 1965 and 1966, he directed the Program of Policy Studies in Science and Technology of George Washington University.

Born in Aberdeen, South Dakota in 1915, Mr. Rock received the degree of B.A. from the University of Minnesota in 1939. He served in the U.S. Navy from 1943 to 1946.

In 1947 Mr. Rock became a member of the U.S. Economic Mission to Greece, then under the Department of State. He served with the Mission until 1949. During the following decade, from 1950 through 1960, he was a Program Director in the Office of Defense Mobilization in the Executive Office of the President. On leave from the Office of Defense Mobilization, he was an Economic Consultant to the Government of Burma in that country in 1956 and 1957.

In the period from 1961 through 1964, Mr. Rock was Senior Researcher at the Institute for Defense Analyses. During this period the International Studies Division of the Institute for Defense Analyses released a number of his studies, including *Common Action for the Control of Conflict; An Approach to the Problem of International Tensions and Arms Control*, which was published in 1963.

Following his directorship of policy studies at George Washington University, Mr. Rock was President of Communications Central, a private research corporation, from 1966 to 1968. He joined the staff of the National Academy of Sciences toward the end of last year. In 1965 and 1966 he had served as consultant to the National Academy of Sciences.

Mr. Rock is a joint author of the monograph, *The Presidential Staff*, published by the National Planning Association in 1961. The book, *A Strategy of Interdependence; A Program for the Control of Conflict between the United States and the Soviet Union*, was published in 1964. His published articles include "The Politics of Science and Technology," which appeared in *World Politics* in 1966.

Mr. ZABLOCKI. Thank you, Professor Rock.

You have listed some very important steps that should be taken.

I think your presentation is most provocative, and leads to very many questions.

Certainly you place a lot of emphasis on the concept of reciprocity. It would seem that it would require a high degree of consensus between people and nations. While all ideological groups, Communists and capitalists, support peace and equality, they differ sharply in their means of attaining those ends. How do we achieve the underlying mutuality of interest that must precede reciprocity? After all, there is a great amount of hostility among nations. There is suspicion. How do we develop this mutuality of interests?

Professor ROCK. People learn by experience. They acquire their values by experience. The differences that we perceive are the result of long differences in historical experience and the ideas associated with it.

The problem of political development is to devise processes, procedures, institutional arrangements, in which people of different views can acquire a common perspective on their problems. Actually, this is in part going on as a result of the development of modern technology and science.

The advanced nations of the world are acquiring similar kinds of economies, for example. And the result is they are going to face the same problems of allocation and development across the board.

The scientific problems dealt with are similar. In each of the nations there are people who already perceive the problem in global terms. I am thinking, for example, of Dr. Sakharov's paper, which was published in the United States not long ago. In it he proposed a program of common effort by the Soviet Union and the United States to work on some of the world's problems such as population and food. In the paper he insisted that one of the essential requirements for tackling these problems was intellectual freedom.

Dr. Sakharov's program could well have been prepared and acquired rather general support in the United States. It is very similar to what you find scientists and political groups in the United States suggesting as a way to approach the problem.

Basically, though, you have to identify superordinate goals and devise ways for people to work toward them, so they acquire common experience.

Mr. ZABLOCKI. Professor Rock, do you foresee any scientific breakthrough, possibly in the communications area, leading to mutual identification and making intentions of nations well-known to each other, which would tend to lead to this reciprocity that you speak of?

Mr. ROCK. I noted in this morning's New York Times that there was an article dealing with the global satellite system for educational and developmental purposes, and suggesting that there was need for a common doctrine and procedure, and a set of priorities for using such a satellite system. It is well within reach. It can be used for education, for development of a common view of the Spaceship Earth. It is a matter of whether we put the effort in devising methods of using it effectively. We need to determine how it may be used for social and political advance. If we do not, it may increase the discontinuities and the apparent differences among the people of the globe.

Mr. ZABLOCKI. It has been suggested that the United States become less the world policeman and our treaties, mutual security treaties with countries, should be reviewed. After all, a mutual security treaty should be reciprocal. A country with whom the United States makes such a treaty should be able to contribute something to the security of both countries involved, or in certain cases, in regional defense.

Would a lessening of the number of treaties that we have, the United States has, with countries in the world, tend to enhance an attitude on the part of great powers and tend to bring on this reciprocity we are speaking of?

Mr. ROCK. I think the treaties were entered into in a technological environment which was far different from the present one. They are really a fallout from the technology of World War II and reflect a desire to contain the Soviet Union.

Since that time, the strategic environment has changed radically. The whole concept of deterrence has taken on new meaning. In addition, the capability to move conventional forces anywhere at a moment's notice has vastly increased, so that the military considerations which led to the treaty system in the first place have vastly changed.

In addition, it has not proved an effective way to achieve political stability in the world. Time and again, we find small countries moving in directions that we are not able to influence, and which then may involve us in ways we would prefer not to be involved. One might better put the emphasis on the development of regional strength, so that there is a real opportunity for a group of countries to develop the kind of economic and political base that would provide stability. We could then deal with them somewhat more as equals and the relationship would be much more of a reciprocal one. This could lead to the conclusion that treaties have lost a good deal of their original meaning.

Mr. ZABLOCKI. This is my final question. If I may, I would just like to ask one more.

Doctor, from your vantage point in having contact with scientists in the Soviet Union, and in other countries, can you advise the subcommittee whether they are of a similar opinion, and realize that treaties with weaker countries may involve a country in a confrontation. The Soviet Union, for example, is it taking a new look? Is there some indication that the Russians are going to back away from an expansionist position that they have been following in the past?

Mr. ROCK. I don't have personal evidence from which to generalize. However, when the book, "A Strategy of Interdependence," was published, it was reviewed by a Soviet journal. The reviewer was in general agreement with the effort to develop a reciprocal basis of stability. He went on to state that the tendency of the United States to act in the role of world policeman had not been adequately dealt with and was an unacceptable role. From this, I would infer that they would feel that this might also be true of the Soviet Union.

Now, one of the difficulties is that as the capability of countries increase, they move out. They build new military systems—the Soviet Union has a fleet in the eastern Mediterranean. The military establishment of the country is much better organized than other parts of it, in order to take advantage of new technology and to extend interest and influence. I would think that there is a tension in the Soviet Union, just as there is in other countries, between those who would wish to base the relationships between nations on a more stable reciprocal basis, and those who realize the new capabilities and are not clear how far they should increase their influence, but would like to try them out.

Mr. ZABLOCKI. Thank you very much.

Mr. Broomfield.

Mr. BROOMFIELD. Thank you, Mr. Chairman.

Professor Rock, you have suggested a number of areas in which research might be done to enhance this political development.

My point is, hasn't a good deal of research already been done by our universities on subjects without significantly notable impact on the world leaders?

Mr. ROCK. There is, of course, a good deal of university research done on an individual basis. Oftentimes it is without the larger systems of information needed to give it substance and strength.

As compared with the amount of research that is done on the smallest widget of the ABM, I would say there is really virtually none in the sense of research in depth. There are centers of Soviet studies, there are centers of regional development of one kind of another, but taken in total, the effort is very limited and not related to the Government in a politically useful way.

Mr. BROOMFIELD. Well, even if there was more work done in these particular areas, though, what indications do you have that other governments would be willing to accept these recommendations?

As I understand it, you don't feel that there has enough been done in this area, and that even if it was done, what guarantee do we have that governments would accept these recommendations?

Mr. ROCK. You have at least as much guarantee as you have that strategic nuclear systems will in fact deter the leaders of other countries.

There have been some successes. The International Monetary Fund, which was the product of the research and thinking during the World War II, has gained a good deal of acceptance among the free world people. The recent meetings with respect to the Intelstat suggest that the Soviet Union is becoming interested in a global communications system. There is no guarantee that this is so.

However, if one were to compare the resources we put into weapons development with what we have put into political development, one might conclude that the opportunity costs would lead one to shift resources somewhat toward political development.

Mr. BROOMFIELD. Thank you, Mr. Chairman.

Mr. ZABLOCKI. Mr. Taft.

Mr. TAFT. Thank you, Mr. Chairman.

Professor Rock, what is your definition of "superordinate" as applied to a goal?

Mr. ROCK. "Superordinate" refers to goals of such basic appeal that people of very diverse interests and ideologies will accept them and expand effort and resources toward achieving them for the mutual interest.

Mr. TAFT. And, just very briefly what, then, are the superordinate goals, one or two of them, that you think we are aiming at? Disarmament is one, obviously.

Mr. ROCK. Well, disarmament is a kind of special objective of the superordinate goal to survive as societies.

I think the goal of survival is really the basis for the evolution of our relationship with the Soviet Union, as we are each a threat to the other's survival. There is really nothing either of us can do if either happens to get a group of leaders who launch the strategic weapons. This has been true for a decade.

We have had a kind of equality in nuclear weapons as far as the population generally goes, because we could each kill a very large

number of the other's people. Survival is what gives the thrust and the continuity to efforts at arms control and related activities.

Material abundance, I think, is a second goal. It is something the Soviets are attempting; it is something we are attempting; it is something that the rest of the world is seeking. In the pursuit of material abundance, as in the search for survival, you develop a whole set of common processes and procedures which, like a coral reef, gradually builds up into a foundation for a new international structure.

There are other superordinate goals. Perhaps one of the primary tasks in defining a "superordinate goal" is a compilation and analysis or the actual interests of the participants and of their perceived interests, which may or may not be the same thing.

For example, in the case of abundance, we tend to define it in national terms, as does the Soviet Union. It may be that we need to look upon it as a global goal. Otherwise, the problems of population and food production and the like are going to give us a very unstable international environment in the future.

Mr. TAFT. Do you think the mere achievement of material abundance is necesarily going to lead you to real progress in this field?

Mr. ROCK. Progress, yes. Then we come to the real question, "Is material abundance enough?"

I think material abundance gives you a chance to transform many of the kinds of conflict we now have into constructive forms. I would not suggest that the design of human beings is such that having material abundance, they are satisfied. The problem of political development will continue as we achieve abundance because we generate new interests, new hopes, new aspirations. The problem of political development is a continuing one, like the problem of weapons development. You are never finished with it.

Mr. TAFT. It sounds to me as though you feel really that the development of material abundance will lead people and the rest of the world to think the way the United States does about these problems. Is that a sound conclusion?

Mr. ROCK. Well, it overstates—I would say yes, in a practical sense, but I would like to qualify it.

The development of a technological economy with a high level of production requires new kinds of physical and monetary policies, new kinds of attitudes on the part of the managers of large-scale industry, new kinds of relationships between the individual and the economic system. The system produces a similar perception of problems in whatever nation it develops. For example, the Soviets are moving toward a pricing system. They found they couldn't allocate rationally, without introduction of a pricing system.

We are finding the same thing, in a smaller way, within the Federal Government sector. We have to devise within the Federal Government a substitute for the market demands that determine how you allocate resources in the private sector.

Mr. TAFT. Well, really, the question I am getting to then, is how do you relate the economic development of underdeveloped countries, or even of countries that are relatively developed, but haven't arrived economically at a point of development that the United States has with the development of nationalism?

It seems to me that the history of the world certainly does not indicate that nationalism somehow vanishes with economic development. In fact, perhaps, quite the contrary.

Mr. ROCK. Yes. I am sorry. This was the point I made but did not make clearly.

I would agree with you, that one of the aspects of the development of economic capability is the development of communications capability. One of the effects of communications is that people perceive their differences more sharply now than at an earlier time. Actually, on the one hand, the context of conflict is aggravated by people perceiving and feeling their national identities more strongly, and on the other hand, the capacity to do something about problems that may have an economic basis is increased.

Mr. TAFT. Then let's go on to the next question.

Your next proposal is that we attempt to deal with these things in the context of regional areas, and organizations. That is all very well with regard to some regional organizations, but let's talk about trying to deal with problems of U.S. relations, for instance, with regard to India, or with regard to Israel, or with regard to Canada, or even, perhaps, with regard to Japan, in a regional context.

How, are we going to do this in a regional context?

Mr. ROCK. Well, I wouldn't go along the regional route to the exclusion of recognition that we are now living in a global society, that there are some problems that have to be dealt with the world around. I was suggesting the regional route where the size and character of the countries are such that there are real possibilities of achieving political and economic gains through the mutual effort.

For example, there are three countries of East Africa: Kenya, Tanzania, and Uganda. A regional organization is likely to increase their stability, to increase their capacity to do sensible things economically, and to enable them to meet the needs and desires of their people more effectively. There is a regional organization developing. For us, it becomes a question of the extent to which we support the regional development or support the individual nations.

Mr. TAFT. Well, of course, it has gone up and down, too. I think they have lost as much regionalism as far as those three countries are concerned, as they have gained.

Mr. ROCK. That is right. When they first became independent, they felt their distinctiveness so urgently that they broke apart and set up their own currencies. Now, mutual progress is again being made.

Mr. TAFT. Let me, Mr. Chairman, if I still have some time——

Mr. ZABLOCKI. Yes; go ahead.

Mr. TAFT. It seems to me that there is one other area; the other members of the committee may know this, but I feel there is something lacking in the approaches that you suggested and, frankly, the approaches that we have gotten from other gentlemen before this committee.

We had two professors of international law here the other day, I twitted them a bit on the failure to develop any meaningful international law over the last 20 or 30 years, insofar as international security is concerned. They pointed out, and quite correctly, that there had been some development in minor ways, on the fringe areas, but none really relating to the whole area of international security. It

seems to me that we have failed to take the lead in this, and that isn't so much related—it is related to your superordinate goals—but it isn't related particularly to the ways you have suggested that we are going to be getting at them.

I don't think with just material progress, or progress in communications or even progress in research as to what our common interests are, is necessarily going to work, unless at the same time you are somehow able to put on to this a framework of law, just as we have done within the development of our free nations.

Would you comment on that?

Mr. ROCK. Well, I would agree. I think of law as a development element, and as closely related to the social and behavioral sciences. Indeed, one project, which I don't believe has ever been adequately financed, is a comprehensive, systematic, and detailed comparison of the law all over the world. There has been some work done in the area.

Mr. TAFT. The International Commission of Jurists has done quite a lot of work along those lines.

Mr. ROCK. Certainly law, a new framework of law, related to a changed international structure, is going to be essential. It now lacks the representative depth it could have with involvement of large numbers of lawyers from around the globe. Such involvement could have more potential for living, dynamic force in nations.

Mr. TAFT. Many Congressmen would say the law is too important a business to leave to the lawyers, too, Professor Rock, and I feel a little that way about it. I don't think it is merely a responsibility of the bar of various nations. I think it has got to be accepted at the top level, and the point that I would make is that I don't think all the research in the world, and all of the understanding and communication in the world is going to lead all of them to feel that they have a common goal, or that you can arrive at something that is mutually beneficial to them.

Under the law, that isn't true within a developed nation or society. We accept things, under the law, that we don't like, but we accept them, because they are the law, and I think you are going to have to have that kind of a situation if you are ever going to have meaningful structure of international peace.

Mr. ROCK. We accept them within national communities.

Mr. TAFT. Yes.

Mr. ROCK. Because we have a sense of common purpose, superordinate goals, that we have somehow acquired through history.

What I am suggesting is that by this kind of research and experimentation, you can speed that process, and perhaps, to some degree, keep up with the changes in the environment and the relationships that are introduced willy-nilly by new technology.

You see, I think that law, before the economic developments started at such a pace, was not required to change daily as some new technology was introduced. Now, a new technology comes in, automobiles in the last 30 years, or television, or whatever it might be, and we don't have a way for readjusting political and legal relationships at the pace that the technology is requiring them to change.

Mr. TAFT. Thank you, Mr. Chairman.

Mr. ZABLOCKI. This poses another question related to it.

Mr. Rock, you say that "We Americans are problem-solving people. This has been our genesis. We have an impeccable faith in the solvability of a problem. We are accustomed to devising new methods and techniques, and given our abundance, we have usually been able to bring it off."

You seem quite confident that we can do it ourselves without the cooperation or really without an effort on the part of other countries, if we are willing to expend our resources. Now, there is a question, of course, how much of our resources should go into this effort? You have, I believe, stated that it should be at least somewhere near the figure of our military expenditure; that would be, at least, some $70 billion.

Mr. ROCK. No; I didn't.

Mr. ZABLOCKI. But if we even spend $70 billion, will we on our own be able to find a solution which the rest of the world will accept? That is the question in my mind.

Mr. ROCK. $70 billion would be adequate, but I didn't really mean to suggest that. [Laughter.]

Mr. ROCK. The reason that I have come to the view that the United States ought to take the initiative in this respect is a result of watching what happens in other fields. In terms of aid, in terms of weapons, in terms of almost everything, there is a great deal of copying, of action and reaction, reciprocal action of a kind, between the nations of the world. It is my view that if we were to take this kind of initiative, the Soviet Union and, hopefully, eventually, even the Chinese, would feel that they would be obliged to respond to it in order to match the proposals and suggestions and activities that would emerge.

This is certainly the case in weaponry, in terms of survival. The response could be slower in the case of constructive resolution of conflict, but I think it would follow; it has in some small ways; the fact that the Congress created an arms control agency did result in a response in the Soviet institutional system to follow what was done.

One of the interesting aspects of the influence of this kind of activity is that the adversary as well as the ally has to read and respond. As we know, all nations collect each other's basic and applied scientific output. There is a tremendous interaction going on as a result of having to read and cope with the ideas the other fellow is putting out. My view would be that if we were to really make a major investment in political development, designed to control and provide constructive outcomes to conflict, then there would be responses in time from our adversaries of the same kind. This is true in any area—this may be too speculative.

Mr. ZABLOCKI. Certainly, your strategy of interdependence between the United States and Soviet Union is something that we would like, of course, to see come to pass, but let me ask you, in view of the Czechoslovakian invasion, the suppression of the Russian liberals, which was in the U.S.S.R. another manifestation of the hard line, what opportunities do you see for closer cooperation with Russia now?

Mr. ROCK. Well, it may take time. I think there is a tension in the Soviet Union. There are groups in the intellectual community who are very much concerned with the problems of relationships, exactly as we are, and they are there to work with. It is true that the Czech

invasion is a setback. There are in the Soviet Union hard liners who are very influential, as they are in other countries.

On your former question, I would just like to reply in a slightly different vein. I express confidence, because I believe that this approach has possibilities. However, I am not sure how high the probability is. Certainly, the prospects compare favorably with certain weapons. Moreover, I don't believe we are talking about billions initially; I think we may be talking about hundreds of millions. We seem to be going ahead with the ABM, even though scientists for whom I have a good deal of respect question its effectiveness. In that case, we are prepared to spend several billions.

I would like to see reciprocal political development tried, and I express a great deal of confidence in this direction, but I am not arguing that the probability of success is necessarily near certainty.

Mr. ZABLOCKI. Well, the problem is that you can't find the tangible evidence as rapidly and as clearly in your proposals as one can in the ABM system. That seems to be necessary in reaction to the Soviet entering into that kind of a system, and stepping up its offensive weapons capabilities.

Your theory is, of course, plausible, and should be researched completely. And, of course, it depends upon research into the behavior sciences, which leads me to this question: At the present time, the Department of Defense has the major, if not the entire bulk of funding for these purposes, particularly in the foreign area, social behavior, science research.

How has this situation affected this research? Do you believe that if the Pentagon gets out of this business, it will cripple the national research capabilities in this area, or should these studies and research be transferred from the Department of Defense to State? What are your views in this respect?

Mr. ROCK. One of the reasons we don't have more tangible evidence of the effectiveness of behavioral and social science is that a large proportion, the overwhelming proportion, of the funding in this area has been in the Department of Defense, and has been subsidiary to the general weapons development and military milieu. This is not the most hospitable environment. It is comparable, in my view, to asking the behavioral scientists, or rather, placing the behavioral scientists in charge of designing a fighter plane. I wouldn't have much confidence in the fighter plane.

In fact, you have had hard scientists, and military people, trying to run a behavioral and social science program. The result is that it doesn't have the tempo and focus that is required. Of course, there are developmental problems in behavioral and social science as well that need to be dealt with.

Mr. ZABLOCKI. You would advocate, then, transfer of this research—if not all of it, the bulk of it—to some other agency?

Mr. ROCK. I think Defense has need for behavioral and social research. However, the research aimed at political development and the control of conflict, I think, ought to have another home. Defense needs research on the performance of the individual and the squad, and so on, in the military organization, as such. They also need knowledge of foreign areas in which they may have to operate still perhaps

it might be obtained in a much more effective and less troublesome fashion by locating the activities elsewhere.

Mr. ZABLOCKI. I noted that you haven't named the home for it. Would you care to advise the committee in your opinion where, if a change is made, research should be placed, in the National Social Science Foundation, or the State Department or some other governmental agency?

Mr. ROCK. I think it is really quite incredible that the State Department spends something in the order of $125,000, or something of that amount, for behavioral and social science research. This would not have been adequate at the end of the 19th century, let alone near the end of the 20th century.

On the other hand, it seems to me that an argument might be made, as I have suggested, for reformulating the role of what we now call ACDA and incorporating with that activity a good deal of the behavioral and social science research that has been supported by Defense. It might require a new agency designed to provide information and innovation in the field of political development and conflict control, which would have a relationship to State and provide assistance to Defense, but which would operate independently.

In an ideal world, the research and development effort could be part of State. However, State has been focused on negotiation. It's viewpoint has a strong flavor of historical determination. The viewpoint is changing, but is still fairly dominant. Historical determinism suggests that you have to cope with things as they come along rather than devise new ways, new processes, new structures for handling them.

Mr. ZABLOCKI. Well, I detect, then, saying it in layman's language, would be that although the child is at a home that is undesirable at the present time, the State Department would be a preferable home, but you would suggest that a new home be formed, perhaps within ACDA. How about the third alternative that you had proposed in your paper?

Mr. ROCK. I didn't talk of the social science foundation, because I didn't know at what period of gestation it now was, and just how soon we could expect it to come into existence.

I think it would have a major role to play, both in strengthening the behavioral and social sciences, and in supporting a good deal of the kind of research we have been talking about today.

Mr. ZABLOCKI. Well, you have a very good grasp of the political situation. That period is going to be long.

Mr. Taft.

Mr. TAFT. Just one question along that line.

You haven't mentioned the agency which I had assumed was the principal gathering source of information in this connection, the CIA.

Would you comment on its role in connection with that?

Mr. ROCK. I haven't because I think it important that this research and development be done overtly. If we are going to get a reciprocal response from other countries, it is essential.

Mr. TAFT. Do you think that eliminates the CIA?

Mr. ROCK. Well, I didn't know it was in the overt business, but maybe it is.

Mr. TAFT. Well, I think it is, to some extent. There are double functions, of course, involved.

Mr. ROCK. If you develop a concept like this, then you would look at the activities throughout the Government and see what relates to it that ought to be brought together. I am just not party to what, if anything, you would move out of CIA at that point.

Mr. TAFT. Well, the information-gathering agency, or function, is not necessarily particularly another than overt, as far as I know, and I think that probably any agency moving in this direction is certainly going to coordinate and work with and use the information gathered there, because that is where much of the information is actually gathered.

Mr. ROCK. I would try to distinguish this from intelligence qua intelligence. It is developmental, it is an R. & D. in experimentation outfit. It is different than the intelligence responsibility for the Government. It is supposed to be inovative, to devise new ways of doing things.

Mr. TAFT. I agree with that, but let's take Red China, trying to get into a developmental phase as to what we are going to do, which none of us seem to have any answers to, and everybody really admits they have no answers to it at the present time.

You are going to have to rely to a great extent on the information that is gathered, I think, by groups such as the CIA, because you can't get the information any other way.

Mr. ROCK. It would have a relationship to it.

Mr. TAFT. Yes.

Thank you, Mr. Chairman.

Mr. ZABLOCKI. Of course, the agency that would be doing the research would be, to some extent, at least, giving guidance to policy, if not making policy.

Mr. ROCK. Yes.

Mr. ZABLOCKI. And I wonder where the CIA would fit in that regard. But then, too, the CIA's present image would probably hurt the effort, rather than help it.

Mr. ROCK. I would think so, and I would view this new agency as an exponent of a point of view. There might be sharp differences, say, with Defense on certain questions, which would highlight what the choices were for Congress and the Nation, whereas the CIA is ideally supposed to be providing straight information.

Mr. ZABLOCKI. Not editorializing.

Mr. ROCK. Yes.

Mr. ZABLOCKI. Professor Rock, in your list of the gaps in political development, as you said, it would be long. Indeed, you list seven.

Would it be presumptuous on our part on the subcommittee to ask your judgment on how these gaps in each instance, might be resolved, and the gaps could be closed?

For example, you say a comprehensive arrangement with the Soviet Union for the control and limitation of nuclear weapons is one problem area. I gather the nonproliferation treaty, in your opinion, is a step in that direction.

Is there anything further that, in your opinion, the United States could exercise as initiative?

Mr. ROCK. When you ask what to do about comprehensive arrangements, you are really asking what is the structure of the world going to be like when we actually resolve the questions that were induced into

world society by nuclear weapons. We are now using a World War II set of relationships to deal with a technology for which they are no longer adequate.

We can't forever live with multiple sets of nuclear weapons aimed at each other. So we are going to have to provide a political framework which changes that arrangement in some fundamental way. I have a very unclear view of how we are going to get to that target. I think we are going to have to do it. Otherwise, sooner or later, nuclear proliferation is going to start taking place again. India and Japan, and so on; Germany, perhaps.

The immediate question is how the United States and the Soviet Union are going to develop a close political relationship. This question has to be approached on every possible front, from science through business through the Government. What we are thinking of, down toward the end of the century, is the kind of relationship we have with England, or perhaps something like that with Canada, which has its troubles, but it is very close, nevertheless.

What the intervening steps are is very difficult to perceive, but that is the direction, it seems to me, we have to move.

Mr. ZABLOCKI. You are advocating a bilateral arrangement with the Soviet Union, in nuclear weapons?

Mr. ROCK. No. You mean the Soviets and the United States?

Mr. ZABLOCKI. Yes.

Mr. ROCK. No, because you really——

Mr. ZABLOCKI. The reason I have that opinion is because a comprehensive arrangement with the Soviet Union——

Mr. ROCK. Well, the Soviets and ourselves are the primary players at the moment, but eventually, we are going to have to include the Chinese and the others mentioned. We are moving toward a whole new political structure for the international system. It is difficult to visualize it today, but that is the drift.

Mr. ZABLOCKI. It would be wrong, then, to interpret that despite the fact that the nonproliferation treaty has now progressed to some extent, it is not advisable to attempt bilateral relations with the Soviet Union?

Mr. ROCK. No; I think, as a matter of fact, that is provided for in the treaty. As I understand it, the powers will now move on to attempt a comprehensive control and limitation of their own weapons, looking eventually toward a scaling down of their weapons systems. That is an element in the treaty.

We must move beyond nonprolifieration, which was really aimed at other people. We must deal with the problem between the Soviets and ourselves, as to how we are going to limit and control our nuclear weapons. Other countries are not going to forever disavow nuclear weapons, if the Soviet Union and the United States are not able to reduce their reliance on them.

Mr. ZABLOCKI. It is probably presumptuous then, on my part, but your list intrigues me so that I would like to have your views on all points. For instance, you say a great variety of procedures and understandings must be enlarged to guard against escalation of conventional conflicts in different areas of the world.

What would you suggest should be done in this regard?

Mr. ROCK. Well in the Middle East, I think, we are going to have to create, for example, some kind of U.N. military capabilities there to maintain peace. That is one possibility.

Mr. ZABLOCKI. And your third point—just give examples for each of them—the systematic strategy and set of tactical instruments to influence Europe's long-run movement toward integration independence.

How would your present NATO involvement be related to your third issue?

Mr. ROCK. There we need to consider the gradual reduction of our military involvement in the NATO area. This, of course, is now hung up on the Soviet intervention in Eastern Europe. In the long run, we need to move away from the deep military involvement we have had there toward other kinds of relationships in education, science, and business and on terms that the Europeans can accept.

Mr. ZABLOCKI. In your opinion, then, we should lessen our military posture in Europe?

Mr. ROCK. Well, I don't see any vital military need. I may be beyond my certain knowledge. Given the increased capability of conventional forces, sea-based forces, and air-carrier forces, I don't see any vital military need for us to keep our forces in Europe.

The reason we are doing so is really a testimony to our willingness to defend the West Europeans, particularly.

Mr. ZABLOCKI. That is rather an important political question.

Mr. ROCK. It is. One hopes at some point that we could work toward a Germany where that wasn't any longer required. This means moving with the Soviets as well as Western Europe.

Mr. ZABLOCKI. Of course, the third and fourth points are somewhat related. An experimentation with concepts and means to induce the Soviet Union to give up intervention in Eastern Europe. That is the $64 question. How do we do that?

Mr. ROCK. As suggested in the text, one of the steps is to expand our political and economic relations with them. I would like to see opening up of trade with the Soviet Union on a far wider basis than we have been willing to or been able to in the past.

Mr. ZABLOCKI. Well, we have been, our policy has been tending toward that direction, certainly toward Eastern European countries, and when we tried to build bridges in Czechoslovakia, or had hoped to do in Czechoslovakia, the Soviets reacted.

Mr. ROCK. I haven't looked at that in detail. My impression would be, though, that there is a balance here, how far you move in Eastern Europe, and how far you move in the Soviet Union. It may be that until you go farther with the Soviet Union, you can't make as much progress as you hoped in Eastern Europe.

Of course, in your text, you had some views on strengthening of regional groupings.

Mr. TAFT. Mr. Chairman, on that trade question, if I might, if you would yield.

Mr. ZABLOCKI. Oh, yes.

Mr. TAFT. Do you think that there is a sufficient economic basis for building United States-Soviet Union trade to anything of any major importance?

Mr. ROCK. I think the——

Mr. TAFT. I mean that I don't know what they have got that we want. I have been over there and talked to them about it and asked them, "What have you got that you want to sell us?"

And they say some oil well drilling machinery, and a few rare metals, and maybe some furs, and what else is there?

There really isn't that much interdependence, tradewise, on the economic bases involved.

Mr. ROCK. No, you are right. If you would look at it in economic terms alone, you might not find it very interesting at this time. If you look at it in the context of political development, you might find it quite interesting.

Mr. TAFT. I agree with that.

Mr. ROCK. When the bureaucrats in a society acquired automobiles, for example, it seemed to change their view to some extent, and I would like to see the Soviets deeply committed to a private transportation.

Mr. TAFT. They had better start figuring out where they are going to put their parking garages.

Mr. ROCK. Well, we have some of the follow-on problems now.

Mr. ZABLOCKI. One of our colleagues has suggested that we could assist the Soviet Union, develop cooperation and interdendence, if we build homes for them, and roads. Help them with problems we have here in this country or to meet shortages.

Mr. ROCK. On the homefront, they seem to have prospects of doing very well. For example, they have developed by a series of trials and errors and by a very stark kind of living, one of the greatest potential housing mass production industries anywhere.

Mr. ZABLOCKI. My colleague will be disappointed that one of our avenues of possible cooperation has been shattered by your testimony. [Laughter.]

Mr. ZABLOCKI. My last question, if I may, and I think this one is one we are all deeply interested in. It is sixth on your list, and calls for "Plans for demilitarization of the United States political interest in Southeast Asia."

This would indicate that we will, after the Vietnam War, I suppose, review our treaties of mutual assistance to the area, which might, of course, necessitate responding militarily when there is a confrontation. We would like to see that be supplanted by regional groupings, but I am concerned with the United States political interest in Southeast Asia.

"Plans for demilitarization of the United States political interest in Southeast Asia."

Just what did you mean by that?

Mr. ROCK. My assumption was that we would have a continuing interest in the area, but that it would be desirable if it rested less, considerably less, on our military commitment to the area. The point relates to the next one. We don't know very well, if at all, how to assist a country in achieving both political stability and self-generated economic growth.

Also, we don't really know how to help a country maintain stability, when it is along the borders of China or in some cases, the Soviet Union. In Burma, there has been almost no involvement. It has had fairly stable periods with really no growth. We referred to it as stagnation.

In Thailand, we have become more and more involved in the country, with certain side effects that are unfavorable for Thailand's future as a stable, independent society. If we are not going to become involved again there in the near future, we have to develop a whole new relationship to these countries, new patterns which would allow us to reduce our military involvement without denying that we still have an ultimate political interest in them.

Mr. ZABLOCKI. Well, this is the purpose of my question, you seem to be saying that we have a package deal, that we give economic assistance, or are only able to give economic assistance if it is tied in with some military or some assistance towards nation's stability and dependence.

Now, this is not quite true. We have given assistance to countries in the area, large sums of economic assistance, without any military pact. In India, and Indonesia, the only time we have given military assistance, for their own defense and security, is when they requested it, demanded it.

Therefore, I don't think we really have militarized our foreign policy in Southeast Asia—I wondered whether in your proposal, you meant that the United States should withdraw its presence from the area. I hope that was not your intention.

Mr. ROCK. No; that was——

Mr. ZABLOCKI. Or maybe it was, and maybe you had a reason for it.

Mr. ROCK. No; my intention was to suggest that we would wish to retain our presence in the area, but that we needed a method for demilitarizing that presence on the mainland of Southeast Asia.

So that I would envisage, as you suggest, a strong economic aid program, if requested, and if necessary.

Mr. ZABLOCKI. I suppose if we just take Vietnam and Thailand, the Indochina Peninsula, as an area, and identify it, there is no question about it, but we must consider the entire region. In Pakistan, India, we have given economic assistance by far greater than military aid, and the only military assistance we gave was after they requested it.

Mr. ROCK. I am sorry. What I was trying to say is that we should not withdraw our interest in the area, but that we should put our relationships on other than a strictly military basis.

Mr. ZABLOCKI. Well, I understand that, and it was my understanding that it is exactly what our policy has been in the past. It was strictly on the economic basis, assisting the countries, and we entered into military assistance only when requested. And, therefore, we really don't need demilitarization of the United States' political interest.

Mr. ROCK. I am sorry. You are referring to India and Pakistan which are outside the area that I had in mind. What I am talking about is Southeast Asia, the Indochina Peninsula, plus Thailand, where we are rather heavily militarily involved.

Mr. ZABLOCKI. You would include Indonesia?

Mr. ROCK. Indonesia in what sense?

Mr. ZABLOCKI. In the sense of demilitarization of the United States interest.

Mr. ROCK. Well, we never have had a military involvement with Indonesia.

Mr. ZABLOCKI. Well, we didn't give——

Mr. ROCK. In the early times; yes.

Mr. ZABLOCKI. We gave some programs, training.

Mr. ROCK. Yes. Indonesia, I would again distinguish as an offshore nation of considerable size and potential. I would tend to treat Indonesia in the same way, if requested, as we have India and Pakistan.

Mr. ZABLOCKI. I am looking back, for example, at Vietnam. Our assistance to Vietnam in the initial stages was purely economic, until about 1956, 1957. Of course, prior to that, we were giving in 1954 to the tune of a half a billion dollars to France, and part of that, of course, was military, for the purpose of keeping France operative in the area. But our earlier intentions were, certainly our programs were and policies were, not military, but the circumstances made it necessary for our getting deeper and deeper involved in the military purposes.

For example, the military is the greater portion of our expenditure in the area today.

I have no further questions.

Mr. Taft.

Mr. ROCK. If I may respond to that, because the Vietnam case is relevant to what we have been talking about.

We went in there after supporting, after providing the resources for the French. We went in there with a non-political view of the problem. It was primarily military and economic. The first, as I recall the first commitment was for a couple of hundred million dollars, which had a very large military component in it. My emphasis would be on the political development of the country, on the stability of the government, the relationships to its people, and effective political organization from the top down to the grassroots. We could, in a small way and with new kinds of knowledge, help them in creating a viable political-economic entity in some of these places.

Mr. ZABLOCKI. Actually, what you are really saying is that we should find some solution, some new method, some political development, where we can withdraw from our commitment such as SEATO, and eventually, that would include CENTO, and, if we go further, it will be NATO.

The view I see here, or the thought, is that we should not have military treaties, if we can possibly avoid them.

Mr. ROCK. Well, I have long felt that our involvement on the mainland of Asia in the way we have been involved is not in our interests in Southeast Asia. This was focused particularly on that regional problem.

Mr. ZABLOCKI. It was not in our interest, you say, and you would fortify that statement with what type of argument?

Mr. ROCK. There are the costs of then having to respond to a local situation with 500,000 men and a fairly long, limited war, which was not supported by our allies in Europe, not wholeheartedly supported by the American people. It seems to me the costs have been very great. The gains, even of success, would have been very small.

Mr. ZABLOCKI. But nobody foresaw the scope of the involvement at the time of the first commitment. If we are going to write off any country, if we write off Southeast Asia, write off Europe, and Fortress America is what we end up with. Isolationism writes off this part, writes off that part, because it costs too much. You can make that argument on any involvement this country had ever had in the past, and will have in the future. And if you are not going to get involved,

then just build a fence around our own country, and we have Fortress America.

Mr. TAFT. Mr. Chairman, if I might raise a question, too, it seems to me that you can't just deal with the South Vietnam situation in this way, without at least taking a look back at Korea. And when you take a look back at Korea, the question then arises, were the mistakes that have been made in Vietnam—and I certainly concur there have been some made—made because we started out to do the wrong thing, or because we did it wrong?

And the other aspect of it is did we take on a feasible job, and no matter how we did it, insofar as the political structure of South Vietnam is concerned?

I think there is a lot of question about that, no matter how much we had suggested or tried to superimpose improvements in their Government. We did try to bring about changes in the Government, that was our first approach, really, rather than a military approach. Could we have been successful?

I question it; I think that this type of problem is far more likely to be solved if you have some basis in international law. At least we had some kind of basis when we went in in Korea, as compared with the situation in Vietnam, where we were trying to deal with just a specific effect in that country alone, unilaterally.

Mr. ROCK. I am not suggesting that we should go back to Fortress America. I think the United States has a vital interest in seeing that no great power dominates the Eurasian land mass. I think its interest in the outcome in particular countries is very marginal, such as Vietnam. I make that distinction with respect to Vietnam, and, of course, some issues are not clear.

In the case of Korea, it was never clear just where the main push was coming from, whether it was a Stalin effort to fill out the empire or whether it was really North Korean.

So, the cases are not all clear, but in the case of Southeast Asia, it seems to me, they were somewhat clearer than otherwise.

Mr. ZABLOCKI. That is debatable.

Mr. ROCK. It always is; yes. [Laughter.]

Mr. ZABLOCKI. Thank you very much, Professor Rock. You have provided a very stimulating morning. We enjoyed your being here, and we certainly appreciate your very direct and frank answers.

Thank you very much.

Mr. ROCK. Thank you.

Mr. ZABLOCKI. The subcommittee stands adjourned.

(Whereupon, at 11:57 a.m., the subcommittee adjourned.)

27-065—69——16

STRATEGY AND SCIENCE: TOWARD A NATIONAL SECURITY POLICY FOR THE 1970'S

WEDNESDAY, MARCH 26, 1969

House of Representatives,
Committee on Foreign Affairs,
Subcommittee on National Security Policy
and Scientific Developments,
Washington, D.C.

The subcommittee met at 10:10 a.m. in room 2255, Rayburn House Office Building, Hon. Clement J. Zablocki (chairman of the subcommittee) presiding.

Mr. Zablocki. The subcommittee will please come to order.

For the past 3 weeks the Subcommittee on National Security Policy and Scientific Developments has heard testimony from distinguished public witnesses on a variety of significant issues affecting our national security policy, now and in the decades to come. We have discussed the weaponry of the present and future, the effects of technology on American strategic thought, the viability of our present alliance system and some alternatives open to the Nation, as it searches for safety and order in a disorderly world.

As a result of our deliberations a number of questions have arisen which require answers from those with direct responsibility for our Nation's strategic policies.

For that reason we are very delighted that our witnesses today that are with us are the Undersecretary of State for Political Affairs, the Honorable U. Alexis Johnson, and the Assistant Secretary of Defense for International Security Affairs, the Honorable G. Warren Nutter, and they are here to give us some of the answers.

I want the record to show that our witnesses are accompanied by the Honorable H. G. Torbert, Jr., Wolfgang J. Lehmann, Capt. Robert D. Pace, U.S. Navy, Mr. Peter Knaur, Mr. Alexander Schnee, and Mr. John Getz, and Lt. Col. Donald Floyd, U.S. Air Force.

We are honored with your presence, Secretary Johnson and Secretary Nutter, and if you would care to begin your opening remarks, Mr. Johnson, we are ready.

STATEMENT OF HON. U. ALEXIS JOHNSON, UNDER SECRETARY OF STATE FOR POLITICAL AFFAIRS

Mr. Johnson. Thank you very much, Mr. Cha'rman. I am not sure I am going to be able to give you the answers, but we will make a try at it.

I am sincerely glad to be here this morning, as you know, this whole subject of scientific developments and its impact on our foreign policy

and foreign relations has long been a matter of very strong personal interest to me.

Mr. Chairman, I am very glad to be here this morning. This committee is addressing a subject of major bearing on our national security. I find myself in full agreement with the central thought expressed by you, Mr. Chairman, in opening these hearings that strides in science and technology require constant review of the quality of our strategic direction and the effectiveness of our strategic policies if the quality of that thought and the effectiveness of those policies are to remain high.

There are many facets to the technological change we have seen in the last 20 to 25 years. There will be just as many or more aspects to the changes we are likely to see in the next quarter of a century.

Clearly, two features of our current and prospective technological environment are of overriding significance from the viewpoint of national security. First, there is the tremendous explosive power at our disposal—and at the disposal of others. Second, there is our ability—and that of others—to deliver that destructive power over great distances in time periods measured in less than 30 minutes. Other technological developments have occurred which bear directly on national security. Still others are over the horizon. Many of these developments, such as high speed/high payload aircraft, and satellite communications, have significant national security implications but none are of as transcendent importance as the nuclear weapon and the ability to deliver it over long distances.

This hard fact means, of course, that the advantage long enjoyed by this country because of geographic position and relative remoteness from the traditional centers of conflict in Europe and Asia, has disappeared. There is no longer a meaningful distinction between a threat to the security of those located physically on the dividing line which still runs through the center of Europe and a threat to our own security. In essential respects, the same is true in Asia.

Therefore, to an extent unequaled heretofore, this country is dependent on the international environment in which we live as a nation. When that environment is insecure anywhere around the globe, that insecurity affects the United States. Security is not simply a function of military power. Lack of security, lack of stability, is basically the product of economic backwardness, social upheaval, and political unrest. The lasting solution to a secure and stable world environment can only be found in the cure of economic ills, in an orderly pattern of social change, and in the local, regional and worldwide political and institutional structures that facilitate peaceful change and adjustment.

Thus, in the long run, our own security depends heavily on factors other than military power. Meanwhile, however, until a sounder basis is created for a stable world environment, we must of necessity continue to rely heavily on mutual deterrence.

There are several points that I would like to make with respect to the implications of what has correctly been called a situation of mutual deterrence between the United States and the Soviet Union.

In the first place, the maintenance of mutual deterrence cannot be taken for granted. Technology continues to change rapidly, and the Soviet Union is continuing to exploit new technologies to develop

and deploy new strategic weapons at a rapid rate. In the absence of a reliable agreement to control the strategic arms race, we must continue substantial efforts to assure that there are no vulnerabilities in our deterrent posture. If we were to permit such vulnerabilities to occur, it might serve as a temptation to the Soviets to adopt more aggressive or venturesome policies.

On the other hand, and somewhat paradoxically, there seems little likelihood that either side can break out of this situation of mutual deterrence and achieve a marked strategic advantage. Any major efforts to achieve a substantial and clear-cut advantage would almost certainly stimulate responses from the other side. Not only would this increase arms expenditures, but it also would likely increase political tensions. Thus, political considerations have a major role to play in the design of our forces. We must have enough to assure a stable deterrent posture, but we also must try to avoid moves that would stimulate arms competition and reduce the chances for possible strategic arms control agreements.

I recognize that the burden of a large Defense Establishment weighs heavily on our society at a time where there are many unfulfilled requirements at home. There are some who advocate that we should drastically reduce our commitments abroad. It certainly is our desire and our intent to see others carry a fair and growing share of the common defense burden wherever this is possible. But, as far as I can see, this country's security cannot be sought by withdrawal from involvement in the world—however superficially attractive that notion may be to some. On the contrary, the risks, as well as the opportunities, posed by technological developments, the costs involved, and the extent to which time and space has been compressed, all indicate that deep involvement of this country in the affairs of the world is both an irreversible fact and a national necessity. So long as there remain in the world fundamental divisions by which men live and govern themselves, it will be in our interest to join with other nations with similar values in collective security arrangements, such as the North Atlantic Alliance.

On the other hand, we would ignore at our peril the impact of technological change on our strategy and our forces. The implications of that impact must be the subject of constant and searching analysis which, on occasions, might well lead to conclusions quite different from those first anticipated. For example, there was at one time in the NATO alliance, a fairly simplistic concept that the explosive power of the large number of tactical nuclear weapons in Europe might be a substitute for conventional forces. Subsequently, systematic analysis, discussion and debate in the alliance have illuminated some of the implications of the potential use of tactical nuclear weapons in Europe and have led us to a new appreciation of the value of conventional forces in deterring aggression.

Another set of questions relevant to national security concerns the role technological change plays in the relationship between ourselves and others. How do technological developments help to strengthen the ties with others in the free world? How do these developments divide?

Let me make only two brief points—and offer one commentary—on this question.

On one hand, new areas of technology can offer valuable new ways of international cooperation, thus strengthening our relationship with others. I have in mind, for example, the Atoms for Peace program, initiated by President Eisenhower and the cooperative activities in peaceful application of outer space technology in which we are engaged with a number of other countries.

On the other hand, the phenomenon often described as the "technological gap" gives rise to jealousies and friction. This is doubly unfortunate since this is a misleading term. The gap between ourselves and Western Europe, for example, is not so much a technological one but rather the result of disparity in size, political organization and resources—financial, human, managerial, and economic—between the United States and individual European countries.

In considering the opportunities offered by technological progress, as well as the divisive pressures created by disparities in the ability to exploit that progress, it is useful to keep one basic fact in mind. Science knows no national frontiers. There is no such thing as a national monopoly on scientific knowledge.

The fundamental scientific discoveries which enabled the United States to produce an atomic weapon in 1945 came from Europe. So did technical innovations such as radar and the jet engine. There is certainly every reason to believe that other great ideas, whether they be in the basic or applied sciences will continue to come from elsewhere—from Europe, from Canada, from Japan, from the Soviet Union and from other parts of the globe. We have certain advantages by virtue of our size, our economic strength and the managerial skill at our disposal in developing practical applications of technology on a large scale. But, we have no monopoly on intelligence, learning, skill, inventiveness, and the other basic factors which make for technical progress. We are more dependent than we normally assume on the scientific and technical skills of others and recognition of this fact will serve us better than to pretend otherwise.

I now come to one of the more immediate and pressing consequences of advanced technological developments. That is the new sense of urgency and realism which technology has imparted to arms control and disarmament measures as a goal of national security policy. An effective system of national and international security does and must increasingly in the future, rest not merely on the more traditional components of national strength, alliances, and international negotiations of worldwide scope such as the U.N. It must also rest upon a structure of agreements and understandings whether formal or informal which can limit, stabilize, and safeguard against accident or miscalculation, the destructive power which modern technology has created. Some of the building blocks in this newly emerging component of international security have already been laid. The limited test ban treaty, the agreement relating to Antarctica, the outer space treaty, and the nonproliferation treaty are the first. It is our hope that larger and more significant advances can follow. They must follow.

In the more distant future, there is the broader question of the potential impact of new breakthroughs in science and technology on our future foreign policy as a whole. Some of these potential developments, such as new possibilities in weather modification, may have a very

direct bearing on national security. As part of our effort toward more systematic exploration of the relationship between these over-the-horizon developments and future foreign policy, we in the Department of State have entered into regular discussions with the scientific community. It is our intent to continue and to develop this dialog.

Finally, there is one area of technological change which has long been of particular interest to me and which offers great practical new opportunities in the immediate future. I am speaking of the great potential offered by the resources available in and under the two-thirds of the world covered by water.

As much as half of the world oil reserves already known are under water beneath the continental shelves. At this very moment, industry is exploiting petroleum resources at a depth of 200 meters beneath the sea and conducting exploration at a depth of 600 meters. Exploitation will reach a depth of 450 meters in 5 years. In 10 years, we may be drilling at a depth between 1,000 and 2,000 meters and 30 percent of the oil and natural gas consumed is expected to come from underwater wells.

It is clear that this potential and the other resources in and beneath the world's oceans will offer a tremendous challenge to industry, to our academic institutions, and to governments. From the standpoint of national security, the challenge to government is to see to it that exploitation of the resources in and beneath the sea proceeds in a way which will contribute to stability and not detract from it. This means early attention to the legal, political, and institutional implications involved as we rapidly approach this last frontier on this globe.

These are some of the thoughts, Mr. Chairman, which have led me to welcome particularly the interest taken by this committee in the impact of technological change on security. Surely, there is no subject more deserving of the constant critical attention of the country's leadership, for the answers to questions posed by modern technology go to the very heart of our existence and progress as a nation.

Thank you very much.

(The biography of Under Secretary Johnson follows:)

U. ALEXIS JOHNSON

U. Alexis Johnson, U.S. Ambassador to Japan since 1966, recently became Under Secretary for Political Affairs, the third highest position in the Department of State. He has filled a number of high diplomatic posts in the U.S. Foreign Service, chiefly in Asia, and has twice held the position of Deputy Under Secretary of State for Political Affairs.

Under Secretary Johnson was born in 1908 in Falun, Kansas. Occidental College awarded him the A.B. degree in 1931 and the LL.D. degree in 1957. From 1931 to 1932 he was engaged in postgraduate studies at the Georgetown University School of Foreign Service.

After some years as an office manager, Under Secretary Johnson joined the Department of State in 1935. By the time the United States entered World War II, he had served in Tokyo, Seoul, Tientsin and Mukden, Manchuria. From 1942 to 1944 his post was in Rio de Janiero. In 1944, he was assigned to the U.S. Army Civil Affairs Training School at the University of Chicago.

Returning to the Far East, he was assigned to Tokyo and Manila in 1945. From 1946 through 1949 he was in Yokohama, becoming U.S. Consul General there in 1947.

Back at the Department of State after 1949, he became Director of the Office of Northern Asian Affairs in 1951 and Deputy Assistant Secretary of State for Far Eastern Affairs from 1951 to 1953.

In the period from 1953 through 1958, Under Secretary Johnson was U.S. Ambassador to Czechoslovakia. During this period he was hardly removed from

Asian Affairs. He was detailed to the Geneva Conference on Indo-China in 1954. In 1955 through 1958 he was detailed to the negotiations with Communist China for the release of U.S. and Chinese citizens.

From 1958 to 1961, Under Secretary Johnson was the U.S. Ambassador to Thailand, where he also served on the Council of the Southeast Asia Treaty Organization. From 1961 through 1964, and again from 1965 through 1966, he was back in Washington as Deputy Undersecretary for Political Affairs, in the office of the Department of State he now heads. Between these two assignments, in 1964 and 1965, he was Deputy U.S. Ambassador to the Republic of Vietnam. His service as Ambassador to Japan extended from September 1966 until his confirmation this year as Under Secretary for Political Affairs.

Under Secretary Johnson was President of the American Foreign Service Association from 1963 to 1964. In 1964 he received the Career Service Award of the National Civil Service League. The Department of State has published a number of his articles and addresses on foreign affairs.

Mr. ZABLOCKI. Thank you, Mr. Secretary.

Secretary Nutter.

STATEMENT OF HON. G. WARREN NUTTER, ASSISTANT SECRETARY OF DEFENSE FOR INTERNATIONAL SECURITY AFFAIRS

Mr. NUTTER. Thank you very much, Mr. Chairman.

Mr. Chairman and members of the subcommittee, as a newly initiated person in the Government service, I am particularly pleased that Secretary Johnson has given such an excellent statement of many of the problems involved in the area of your investigations, and I want to express my regret in advance that I probably will not be able to be as informative in this first contact with the committee.

Mr. Chairman and distinguished members of the subcommittee, I welcome this opportunity to appear before you so shortly after assuming my duties in the Department of Defense. I will not, of course, pretend to be fully informed on the problems being addressed at these hearings, but I am already aware that scientific developments compel us to undertake a careful review of our national strategic posture, particularly as it relates to our commitments abroad.

I have been impressed by some of the testimony at open hearings during the past 2 weeks emphasizing the importance of remaining flexible and avoiding undue reliance on any single system for protecting our Nation. For example, we must continue to search for the proper balance between strategic and general purpose forces. Experience over the last two and a half decades demonstrates that the struggle for peace and national security depends heavily on both.

In the unfortunate era of confrontation, which we all earnestly hope may soon come to an end, our strategic forces have deterred general war and use of nuclear weapons by our adversaries. Yet even in these times our response to threats of aggression has had to rely on more than nuclear weapons. We may point to the case of Europe, where our security arrangements hinge on the collective capabilities of ourselves and our NATO allies to meet aggression without nuclear weapons if the nature of the attack so prescribes.

Over the years ahead, there will certainly be significant developments affecting the mobility and firepower of our forces. At the moment, it does not seem likely that innovations on the horizon will involve the same leap in technology brought about by introduction of fusion and fission weapons. While we can never be certain, it also does

not seem likely those innovations over the next few years will radically alter the basic ingredients of our defensive posture.

Technological progress in the military sphere is becoming more and more widely diffused over the globe, but the United States and the Soviet Union will probably retain their lead over other countries in the immediate future. Our own security interests in Europe and Asia will continue to depend heavily on close cooperation with our allies, and it will be in our mutual interests to work together with our friends.

If we are to proceed with innovative improvements while strengthening the alliances undertaken with our friends in pursuit of mutual national interests, we must be mindful of the interests of our allies. As an example, the ABM debate has been, and will continue to be, closely observed by our allies. Their legitimate concerns over deployment of that system have been carefully taken into account. The point to be made here is that we must keep in mind the repercussions of technological advances on our friends as well as adversaries.

These are some initial thoughts in my first few weeks on the job. I am sure that I shall have additional views to share with you in the future. Meanwhile, I shall do my best to answer any questions that you may wish to direct to me.

Thank you very much.

(The biography of Assistant Secretary Nutter follows:)

DR. G. WARREN NUTTER

Dr. G. Warren Nutter, economist, is Assistant Secretary of Defense for International Security Affairs. Until his confirmation for this post this year, Dr. Nutter was Paul Goodloe McIntire Professor of Economics at the University of Virginia, Chairman of its Department of Economics, and Director of the Thomas Jefferson Center at the University.

Born in Topeka, Kansas in 1923, Assistant Secretary Nutter was educated at the University of Chicago, which awarded him the A.B. in 1944, the M.A. in 1948 and the Ph. D degree in 1949. From 1943 through 1946 he served in the Army of the United States.

From 1946 through 1947, Dr. Nutter was Instructor of Economics at Lawrence College. He was Assistant Professor of Economics at Yale University from 1949 through 1956. He served with the Central Intelligence Agency from 1952 to 1953. He joined the faculty of the University of Virginia as Associate Professor of Economics in 1957. He has been a full Professor at the University since 1958.

Dr. Nutter has been a member of the research staff of the National Bureau of Economic Research since 1955. He was Economic Adviser to Senator Barry M. Goldwater during the Presidential campaign of 1964.

Dr. Nutter's principal fields of specialization in economics are industrial organization, economic theory, and Soviet economic growth. He has contributed to a number of professional journals. His books include *The Extent of Enterprise Monoply in the United States, 1899–1939: A Quantitative Study of Some Aspects on Monopoly*, published in 1951; *The Growth of Industrial Production in the Soviet Union*, published in 1962; and *The Strange World of Ivan Ivanov*, published this year.

Mr. ZABLOCKI. Thank you, Secretary Nutter; of course, we will look forward to your additional views as the subcommittee pursues the questions that have been vitally interesting to us.

Both of you gentlemen have given very fine statements.

My first question would be to you, Secretary Johnson, on a matter which many have a common interest, and that is the use of the floor of the ocean.

On page 12 of your statement, you deal with the exploitation of oil and gas reserves on the seabed. It has been suggested that the owner-

ship of these resources be vested in the United Nations, which would profit from leases of these oil rights.

What is your position on that suggestion?

I might further ask what problems will our country have if we try to exploit the seabeds? What treaties will be necessary with other countries, including our allies?

What problems do you foresee in this particular area?

Mr. JOHNSON. Mr. Chairman, after returning to Washington on a number of occasions, I usually find when I come back here that most of the problems which I have had to deal with have been those that have continued from the past, and have not changed too much.

As a personal note, when I came back this time, I was briefed on this problem of the seabeds, which has, as far as I am concerned, burst upon us just in the last couple of years and the deeper I got into this subject, the more complicated and important it seems to me.

We are in the process, still, of seeking to formulate a U.S. Government position on this question. It is one in which we have very great conflicts of interest within our country, within the Government, and it is one, of course, in which there are very great conflicts in the international community.

The United Nations General Assembly has established a subcommittee on the seabeds, which is now meeting in New York, and will again meet this fall.

I would say that at the present time, not only ourselves but others are still groping for some kind of a policy in this field.

For example we have said, President Johnson said, if I recall his exact words, that the resources of the deep seabeds shall be used for the benefit of all mankind. The question is, where does the Continental Shelf end, and where does the seabed begin?

One of the problems in this area is that we simply don't have the scientific and technological knowledge yet to make judgments on these questions.

Whereas a great deal of oceanographic research has been done, there is still an enormous amount that we don't know here. In some ways, I think we know more about space than we know about the sea.

And this question of the Continental Shelf geologists agree that there are great resources of oil and gas, on the Continental Shelves.

The Continental Shelf itself needs to be defined. Without going into details, in general, you have an area that is usually called the shelf, that goes out someplace, it will go out fifty or a hundred or more miles, other places, it will be fairly narrow, and then you will have a dropoff, fairly steep, and then before it reaches the deep seabed, there is a sort of a bulge that is called the rise.

This is usually at the depth of an average of 1,500 to 2,000 meters, and our geologists seem to think that the larger part of oil and gas resources may be found in the area of this rise.

Then you have the deep seabed, or the abyss itself. In addition to your oil and gas resources, you have the mineral resources the manganese nodules that are found in just untold millions of tons on the seabed, from which you get not only manganese, but you can also get nickel and copper.

And these you will find on the Continental Shelf itself, as well as in the deep abyss.

Now as far as our own interests are concerned, the National Petroleum Council is now in the process of drawing up a position and a view on what the oil industry feels should be our position.

In general, I would say that they are tending to move toward claiming a wide shelf. Of course this is a case in which sauce for the goose is sauce for the gander.

If we claim a wide shelf others, of course, are also going to claim wide shelves.

As far as our defense interests are concerned, in general our interests are in a narrow boundary. This gets involved with the whole question of freedom of the seas, and our ability to use the seas, although we are again talking only about the land under the water.

I fact, when a country begins to claim the land under the water, then the concern is that it will tend to move toward claiming the sovereignty over the waters above, and you get into these problems.

So without going into further detail, all I will say is that this is a subject that is very complicated, we still don't have the scientific information, even, that we need to form a position on it, and I think it is going to be considerable time before this Government will be able to decide on the position which we feel is going to be in our best national interests—not only of our own coasts, but off the coasts of other countries.

Mr. ZABLOCKI. In regard to the use of the seabed for military purposes, the Soviet Union, because it would be advantageous to that country, has offered an agreement forbidding the use of the seabed for military deployments.

What is our present position in this regard?

Mr. JOHNSON. We, in general, support the proposition that weapons of mass destruction shall not be placed upon the seabeds.

And the Soviets have offered a proposal to the 18-Nation Disarmament Committee now in Geneva on this, and in fact, I have not seen the details of it.

In general we support the position that the seabed shall not be used for the placement of weapons of mass destruction. Whether or not we are going to be able to arrive at an agreement with the Soviets on this, and also with others, remains to be seen, but in general, we support the proposition that it shall not be used for those purposes.

This is somewhat parallel to the position that we have taken with regard to outer space.

Mr. ZABLOCKI. If I may just ask one further question about a very interesting note on page 10. You state that in addition to our present alliances and international ties, such as the UN., we must also rest upon the structure of our agreements and understandings, whether they are formal or informal.

Then you go on to some examples, such as the limited ban treaty, the agreement relating to Antarctica and the outer space treaty.

Mr. JOHNSON. Yes.

Mr. ZABLOCKI. Mr. Secretary, does that mean that the United Nations is not as effective as we would like to have it, and that if we are going to have some understanding and agreements, it will have to be between the big powers, and only solely between the big powers, outside of the United Nations?

Mr. JOHNSON. No, that was not necessarily my implication. The United Nations has formed the forum, if you will in which we have been able to reach some of these agreements.

Some of them may originate elsewhere like the nuclear nonproliferation treaty, which was one of very heavy interest to both ourselves and the Soviet Union, but also, the United Nations was involved in not the negotiation of the treaty itself, but it was involved in various aspects of it, and as you know, the United Nations General Assembly endorsed the principle of the treaty, and this is one of the encouragements other countries had toward adhering to the treaty.

I might note in this regard that whereas some countries have very quickly and very cheerfully voted for the General Assembly resolution, endorsing the principle of the treaty, when it came to negotiating and signing the treaty, they have been much slower in doing so.

Mr. ZABLOCKI. My time has long expired.

Governor Thomson.

Mr. THOMSON. Mr. Secretary, you have recently returned from Japan, I believe.

Mr. JOHNSON. Yes, sir.

Mr. THOMSON. And one of our urgent problems there, in that part of the world, relates to Okinawa. And shortly you will be engaged in a meeting of SEATO.

Mr. JOHNSON. Yes.

Mr. THOMSON. Now, have our scientific developments been so great that we don't need Okinawa or SEATO, any longer?

This committee is looking into questions of that nature. Have we passed the era where we need agreements such as SEATO and bases such as Okinawa?

Mr. JOHNSON. Mr. Thomson, I don't think so. I think the nature of our bases, the nature of our need for the bases, changes. This is a subject which I have discussed a great deal with the Japanese.

The Japanese would like to think the scientific developments, development of the Polaris and the Minuteman, has eliminated the need for bases in their territory and what I have said to them, and what I believe, is that this is far from the case, because this brings us to this question of the importance of graduated deterrence.

As I said to them, if in a situation involving the security of Japan, or areas immediately adjacent to Japan in which they are interested, the only option open to the United States was to use its strategic nuclear weapons, the other side might well estimate that we would not do so, in any particular situation, and if they were right in that estimate, it would encourage them to nibble here and nibble there, or do this and do that, in the knowledge or the estimate on their part that we would not unleash our full nuclear power in order to deal with that particular kind of situation.

Therefore, instead of deterring war, it would lead to war, possibly through mistake, as many people feel that the other side were led by a misestimate to our intentions to the attack in Korea in 1950.

On this, if deterrence—my own view, very strongly, is that if deterrence is to be effective it must encompass the widest possible spectrum of actions on our part, that we have the capability for the widest possible spectrum of actions.

If we have open to us a wide spectrum of actions, a possible enemy could never be sure which one we might use, but he, knowing that we

do have that wide spectrum, he may well estimate, and properly estimate, that we will react more readily than if we only had one option, you might say, of nuclear strategic nuclear power.

Therefore, I think it is very important, and very essential, to retain as wide a spectrum as possible, of different things you can do, both in the nuclear field, and in the conventional field, the nonnuclear field.

And in this regard, I think our base position in Japan, our base position in Okinawa, is very important, and very essential, not only directly to us but also to enable us to carry out our commitments in the area.

Not in the sense of having to fight. My hope is that having the wide spectrum open to us, that it will serve as a better deterrent and reduce the chances of war.

I don't think of these areas so much in terms of using them to fight although we have to be prepared to do so, and our ability to do so is what makes our deterrent effective, but rather in terms of deterring attacks.

Mr. THOMSON. Well, didn't the Russians occupy some of the northern islands of Japan, and are still holding them?

Mr. JOHNSON. Oh, yes; very much so.

Mr. THOMSON. And are the agitators in Japan demanding a return of those Russian islands?

Mr. JOHNSON. Yes, even the Communist Party of Japan came out with a statement asking for their return. The difference is at the present time that there is no Japanese population in those islands.

The Japanese population at the time of their occupation was relatively small. It was all evacuated and there is not now any Japanese population on the island.

On Okinawa there is a Japanese population of about a million people, and this makes a difference of quality in the situation, if you will, as far as the political aspects of it are concerned.

Mr. THOMSON. Have we ever suggested that when the Russians return the islands, that then we will discuss with the Japanese the return of Okinawa?

Mr. JOHNSON. No, we have often speculated on whether the Russians might take the position that they would return the islands, if and when we returned Okinawa.

However, they have not done so. So——

Mr. THOMSON. Well, why don't we reverse that in our arguments and just tell the Japanese that when the Russians return the islands we will talk about returning Okinawa.

Mr. JOHNSON. Well, I would hate to make our policy dependent on what they do, or don't do. And I don't think this would resolve the problem on Okinawa.

I would be glad to discuss Okinawa in detail if you wish but this is a subject you get me started talking on and I can talk at some length on.

It is a very serious problem, let me say and it is a question of irridentism, of course.

You have the 1 million people on Okinawa that want to be reunited to Japan. We have been running them under a semimilitary type of arrangement, although they have had increasing autonomy in recent years. Okinawa was a prefecture of Japan, and——

Mr. THOMSON. The poorest one, I understand?

Mr. JOHNSON. The poorest one, and it is an article of faith that every Japanese wants Okinawa returned to it and every Okinawan wants to return to Japan.

Mr. THOMSON. But retaining the benefits of the American dollar that is going in there, if possible?

Mr. JOHNSON. Well, some yes and some no, but let me say that the issue is not abandoning our bases in Okinawa. There are the radical left, of course, that advocate that. The issue is simply whether or not the administration of Okinawa shall be taken over by Japan, and whether our base structure there will come under the same arrangements as we have with regard to our bases in Japan.

We should not equate the return of administration to Okinawa with a removal of our base structure there. That is not the issue at all.

Mr. THOMSON. Thank you.

Mr. ZABLOCKI. Mr. Fountain.

Mr. FOUNTAIN. Thank you, Mr. Chairman.

Mr. Secretary, it is nice to see you here in Washington. It's good to see you again so soon after some of us had the pleasure of visiting you when we were on a Far Eastern study mission last year.

Mr. JOHNSON. Yes.

Mr. FOUNTAIN. It was toward the end of last year, and I want to thank you again for the very excellent briefing you gave us, and also for the many courtesies you extended to us there.

Mr. JOHNSON. Thank you. I enjoyed having you.

Mr. FOUNTAIN. Mr. Secretary, a recent story in the Christian Science Monitor says that the Army is planning to develop what is described as a nation building school at Fort Bragg, N.C., in my home State.

I don't usually have objections to things going there but I understand its graduates would be considered specialists in overseas stability operations, and would fill many posts in the Pentagon and other Government agencies.

I wonder if you would give the subcommittee some explanation of just what the purpose of this school is, and what it would do, and the basis for making this decision?

Mr. JOHNSON. I am sorry, Mr. Fountain, I just don't—I have not seen the article, or heard of the subject. I know that the Army has various training programs down in Fort Bragg, but I am not aware of this.

Mr. NUTTER. I am not aware of the details, but we would be very glad to supply them.

Mr. FOUNTAIN. Well if you could supply the information for us.

(The information referred to follows:)

The United States Army, JFK Center for Special Warfare is planning an internal reorganization to more efficiently manage the variety of courses taught at the Center to U.S. Military and allied officers and enlisted men. Additionally, the Military Assistance Officer Program, a new career program, has formalized ongoing Psychological Operations and Civil Affairs training to better prepare officers to cope with the complex of politico-military activities involved in assisting selected foreign countries resolve their internal security problems. It is to this expanded training and reorganization that the question of a nation building school presumably refers.

As early as 1952, Ft. Bragg became the focal point for certain aspects of military assistance and advisory training when the Psychological Warfare School relocated to Ft. Bragg, North Carolina, from Ft. Riley, Kansas. From that date,

the Center has expanded its training to include Special Forces, Internal Defense and Development, and increased military assistance and advisory training.

At the present time, the Center offers 13 courses ranging in length from one to 15 weeks. The Military Assistance Course is an additional course designed to improve the Army's posture in providing advice and assistance to selected countries.

This activity does not represent an attempt by the Army to enter into activities properly belonging to other agencies, but rather an effort to improve its capability to perform Army tasks in underdeveloped countries.

Mr. FOUNTAIN. Dr. Nutter, in an interview in the U.S. News & World Report of April 13, 1964, I believe you are quoted as having said of the Soviet leaders, "As soon as they become fat, or rather, fatter, they get more belligerent and aggressive."

Do you believe the history of the past 5 years has borne out that view, and if so, what implications does this have for successful arms limitations talks with Russia?

Mr. NUTTER. Well, Congressman Fountain, I think that particular statement was made in the context of events that had developed up to about that point.

As we all recall, reference was made particularly to Chairman Khrushchev. As he viewed his country improving, economically, his response was not exactly one of removing pressures from the world, but in fact, the opposite—that of instituting the space race and ultimately positioning the missiles in Cuba, and so on.

As to the situation since 1964, I think that with the removal of Khrushchev, the difficulties with the Chinese, the explosion of the Chinese nuclear weapon and the still, I suspect, unstable leadership situation in Russia, the response has not been the same as it was during the Khrushchev period. It would be a bit premature, however, to judge that the leadership has in any real sense mellowed and become more responsible as their conditions improved.

While they have certainly not been more responsible in such important matters as installation of ICBM's, they have become more cautious in certain respects. I would suspect that the very difficulties they have encountered in their economic system have had a great deal to do with their becoming more cautious, and it is in that sense that I was speaking of the fatness and thinness.

It is a question of how they respond to improvement in their economic system.

Mr. FOUNTAIN. Of course what they are doing in support of North Vietnam, while at the same time smiling pleasantly and talking to us about those things in which we all have an interest, certainly indicates, I think, as you point out, that they have in no sense changed in their initial purpose.

Would you agree?

Mr. NUTTER. I would agree with that, Mr. Congressman. Yes, sir.

Mr. FOUNTAIN. Thank you Mr. Chairman.

Mr. ZABLOCKI. Mr. Broomfield.

Mr. BROOMFIELD. Dr. Nutter, in the last day or so, the press has been having a number of articles regarding Prime Minister Trudeau's visit here in the United States on the ABM question. What is the real story?

Did we contact the Canadians before the President made his announcement or not?

Mr. NUTTER. Well, Congressman Broomfield, I am not entirely aware of all the circumstances that were involved in this particular situation.

The Canadians were fully consulted and informed of the proposals for the Sentinel ABM system and its technical characteristics and I think they have been very carefully informed on ABM matters over an extended period of time.

I believe they were informed of the safeguard decision before the President announced it. To what extent there was actual notification as to the specific timing of the announcement, I am simply not aware.

Perhaps the Under Secretary of State can be more informative than I.

Mr. JOHNSON. Does Trudeau say that he was not informed of the decision?

Mr. BROOMFIELD. Apparently there have been some stories that allege that he was not informed of the position on the modification that President Nixon has announced.

Mr. ZABLOCKI. He says that he was not conferred with or consulted.

Mr. BROOMFIELD. Conferred or consulted.

Mr. JOHNSON. [Security deletion.]

Let me say on the ABM question that long prior to our decision to on the Sentinel, we have been engaged in discussions in the NATO group, and primarily in the NATO nuclear planning group, on the ABM.

So also with [security deletion]. Canada, of course, both bilaterally and as a member of the NATO group, in the sense that we told them, explained the system to them, we explained our thinking about it, we gave them opportunity to express any views.

We were not seeking to involve them in our decision. But we gave them an opportunity to express any views that they may have.

And some did express views, but nothing of a very definitive nature, as I recall it.

Now prior to the President's statement on the safeguard system all of these countries were also informed of what was planned.

[Security deletion.]

Mr. BROOMFIELD. Mr. Nutter, on nuclear weapons in Israel, what is the situation there?

Mr. NUTTER. Well, Congressman Broomfield, I think that there is considerable evidence that they have a capability to move toward some kind of nuclear production. They are very intelligent people. [Security deletion.]

Mr. BROOMFIELD. Mr. Secretary, regarding Okinawa, you are probably the most experienced man in this area, how do you interpret Sato's change in attitude on this whole area of Okinawa?

Do you feel his statements are, because of the political situation and the upcoming elections there, that have forced him into a different attitude on Okinawa?

Mr. JOHNSON. [Security deletion.] The issues of return of administration of Okinawa is a very popular political issue in Japan, and I feel that Sato feels that he could not leave this field to the opposition.

With such a popular issue, that he needed to take it himself. And he has tried to handle it, though, may I say, in a very responsible manner.

He has kept what he calls a blank sheet, as far as the conditions under which it would be returned. He has been subject to very severe Diet interpellations on it, during this last Diet session.

And he has very carefully kept himself full freedom of action as far as the conditions. But as far as the principle of the return of Okinawa he has taken a fairly strong stand on this—not asking for its immediate return, but saying that it is important that some agreement be arrived on setting a date at which it will be returned, so as to remove the issue from politics.

On this, may I say, the opposition in Japan is seeking to mount a very major campaign with respect to the security treaty next year.

As you know, the security treaty continues indefinitely, unless it is renounced by either party, which could be done after June of next year.

The security treaty issue is not a very popular or very strong one in Japan; that is, most Japanese accept the security treaty and desire to see it continued.

However, what the opposition hopes to do, and they have announced this publicly, is to bring the Okinawa issue in which is a popular issue, and one that is subject to demagogic appeal.

Mr. BROOMFIELD. Sure.

Mr. JOHNSON. And if they can bring the Okinawa issue in, and mix it up with the security treaty, there is no direct relationship between them, but they can bring these two things in together, they are going to be able to mount a much more effective campaign on the security treaty. [Security deletion.]

Sato has very carefully kept to what he calls his blank-sheet principle.

He says, on the paper on this. He has not committed himself, and he is keeping his options open on this.

Mr. BROOMFIELD. I would like to close, Mr. Chairman, by commending both the gentlemen we have today on their brief prepared statements before this committee. This is an unusual situation.

Mr. ZABLOCKI. Mr. Findley.

Mr. FINDLEY. Mr. Chairman.

Mr. Secretary, in the campaign, Mr. Nixon spoke about the need for greater consultation with our NATO allies, and I have been keenly aware, in my study of NATO problems, of the sensitivity of Canada, sensitivity that arises partly from our repeated talk about a partnership between the United States and Western Europe, which left Canada pretty much in limbo.

Because of the proximity of Canada to the United States, and these ABM bases, I am disappointed frankly that consultation did not occur, and would appreciate it if you could give me the rationale, if you know what it was, to justify the absence of consultation.

Mr. JOHNSON. Well, I was not personally present or in on all the discussions on this [security deletion].

Mr. FINDLEY. But at least we could have said we offered consultation, we asked their views, and they had none to present, or chose not to present any.

Mr. JOHNSON. [Security deletion.]

Mr. FINDLEY. And our position would be much stronger in our relationship with our NATO allies, because of this procedure, I would think.

Mr. JOHNSON. Well, I am as you know, I have just arrived back recently, and I am simply not personally aware of all the discussions that have gone on.

Mr. FINDLEY. I see.

Mr. JOHNSON. During the last year with Canada on this nor did I get myself briefed on this, but they have had actual opportunity before the announcement of the Sentinel system, and during the recent months when we have been discussing the modifications of this Sentinel system. [Security deletion.]

I don't really think I could go beyond that, sir.

Mr. FINDLEY. Well, I don't wish to make a big to do about it but I do feel that during the past 8 years our NATO allies have had justifiable complaint on a good many occasions that they were not consulted about matters affecting them intimately.

Mr. JOHNSON. [Security deletion.]

Mr. FINDLEY. And I would hate to see the new administration begin a new series of such events.

Mr. JOHNSON. [Security deletion.]

Mr. FINDLEY. Because it isn't helpful.

Mr. Nutter, you are recognized as one of the foremost experts on the Soviet Union.

I would like to know if you believe that the Soviet leadership is fearful that the United States might launch a first attack?

Mr. NUTTER. Mr. Congressman, my judgment would be that they are not. They are, of course, very defensive minded, and have been. This is characteristic, I think, of Russian thinking for many years, as a result of a number of invasions that they have had to suffer.

But I would not believe that their assessment of American intentions and objectives would be one that would lead them to believe that we intended to launch a first strike. Now I can't be sure what is going on in their minds, entirely, but I see no reason for them to compute any such intention to us. They are pretty hardheaded realists when they assess people. They, of course, make their assessments within the kind of ideology which leads them to characterize us as capitalistic exploiters and so on; but I really don't believe they would come to that conclusion, on the basis of our foreign policy.

Mr. FINDLEY. Do you believe that the average Soviet citizen who is aware of world events has a genuine fear of attack by the United States?

Mr. NUTTER. Of a nuclear attack, Mr. Congressman?

Mr. FINDLEY. Yes, of an attack.

Mr. NUTTER. I would find it very hard to make a sound judgment on that matter. I haven't discussed these matters with ordinary citizens for a long time.

When I have had conversations, such citizens quite clearly were imbued with a propagandized view of American policy, which led them to argue that we were the aggressors in world affairs, that we were encircling the Soviet Union, and so on, because this in effect is the official position. They also believed that we were installing bases around the perimeter of the Soviet Union with aggressive intent.

The ordinary citizen is very fearful of war. The people have suffered a great deal. And I think that their views are likely to be very colored and that they would likely think of us as a potential aggressor on the basis of the campaign. On the other hand, they also tend to be quite friendly toward the United States for other reasons. They are aware of the help that we have given them at various times; and although

their attitudes always reflect the Soviet propaganda effort to separate the American Government from the American people, they will speak differently.

I know there are great differences of opinion on the strategy of the Soviet Union on this particular question and on how anxious either the Soviet Government or people are about the possibility of attack. My own feeling is that this is not the overriding fear or the overriding consideration of these people in their thinking.

I think the Soviet Government view is that we are not going to be aggressive toward them or their satellite countries, and that the general population probably would share that view.

Mr. FINDLEY. The other day, I believe it was Harold MacMillan was quoted as stating that he thought it desirable in the long term at least that the United States and the Soviet Union team up in some form, in order to meet the aggressive threat posed by Communist China.

This struck me as being backwards theory. It would seem to me more logical at this juncture for the United States to make some gestures at least to normalize relationships with China, if for no other reason than to exploit the differences between China and the Soviet Union.

Would you comment on this?

Mr. NUTTER. Well, Mr. Congressman, I would hesitate to venture into foreign policy at this point. The Defense Department has been lectured about this, and perhaps properly so, in the past.

Mr. FINDLEY. No press is here.

Mr. NUTTER. All right, sir.

Well, it is not necessarily just the press. [Laughter.]

I think that one has to give very careful weight in these matters to exactly what kind of threat we are talking about—whether it is immediate threat, some future threat, something far off. I am going to pass this ball on to Secretary Johnson, if I may, but let me close with just one comment. [Security deletion.]

Mr. FINDLEY. I am encouraged by that.

Mr. NUTTER. Now I will pass the ball.

Mr. FINDLEY. Thank you.

Mr. JOHNSON. Well, I don't know that we want to get into China policy. You get me talking about this——

Mr. FINDLEY. It is pretty fundamental, though, and very much before the Nation.

Mr. JOHNSON. Let me say, I have said for many years, as you know, I carried on a conversation with them, over 4 years, and kept an interest in this over the years, I have said for many years that if we would offer to recognize Communist China tomorrow, they would turn us down flat.

Mr. FINDLEY. I would imagine that is true.

Mr. JOHNSON. I think the experience in recent months of both Canada and Italy are very illustrative of this. As you know, both Canada and Italy have publicly announced their intention to establish relations with Peking. They have made approaches to Peking.

This is oh, months ago now, and to the best of my knowledge, they have not received any response from Peking.

My own attitude on China is that until some fundamental changes take place within Peking itself, there is not much more that we could

do in the way of offers or initiatives or proposals that would have any influence on their attitudes at this time.

My own attitude is, if I may say so, to maintain the posture of an open door, if you will. At such time as they desire to move towards a modus vivendi of any kind with us, I would be very responsive. I think these will come in small things, first, rather than in dramatic changes, but until these changes do take place in Peking, I don't think that gestures from the outside are going to have much influence on the course of the events that are taking place within China itself.

I think those are the overwhelming factors in the situation.

Mr. FINDLEY. One step the United States could take on its own would be to place our trade policy with China on exactly the same basis as with the Soviet Union. Now this might not lead to trade, but Germany, for example, has developed some commerce with China, even though it has no consulate, or trade mission at all.

Mr. JOHNSON. And also Japan has. Yes.

Mr. FINDLEY. Right. So at least we are saying, we are the ones who put the trade block up at the present time, and if we would announce that the trade block was down, would we not be in a better position to have this open door?

Mr. JOHNSON. I think the subject is open to discussion and consideration. You will recall back in 1961, at the time where they were very short on food there, President Kennedy offered to consider with them the shipment of grain to China. We initially did this privately to make it clear we were not using it for a propaganda gesture, and they turned us down flat on this, as they did on the shipment of medicines and serums.

They have just shown no real interest in moving towards any modus vivendi.

The great disappointment, of course, was the cancellation of the February 20 Warsaw meeting. I think it was the hope of all of us that this might give us some clues or insights as to whether they were interested at all in moving, and their abrupt cancellation of that indicated that there was undoubtedly confusion in Peking, first having proposed this meeting, and then having cancelled it at the last minute, as they did, indicated that there is still a considerable amount of confusion within Peking itself, and I personally am very disappointed that it didn't take place.

[Security deletion.]

Mr. FINDLEY. Does our State Department prohibit travel to mainland China now, our passports?

Mr. JOHNSON. Are passports valid? The passports are endorsed, but let me say——

Mr. FINDLEY. Did they list China as forbidden country?

Mr. JOHNSON. They, it does list China, but you can get a validation for going to China quite readily. We have many categories, journalists, scholars, teachers, doctors. I forget what our categories are now.

Mr. FINDLEY. Why don't we just lift that? What is the harm from that?

Mr. JOHNSON. Well, again, I wouldn't argue. That is something that could be excused, certainly. And, of course, the recent court decisions on this have called into question the whole efficacy of these passport endorsements, in any event, and we are studying the legal aspects of that now.

Mr. FINDLEY. Thank you very much, Mr. Chairman.

Thank you, Mr. Johnson.

Mr. ZABLOCKI. Mr. Taft.

Mr TAFT. Thank you, Mr. Chairman.

Secretary Johnson, what trade limitations with Red China are presently in effect, in a general way?

Mr. JOHNSON. As far the United States is concerned?

Mr. TAFT. Yes, on U.S. citizens.

Mr. JOHNSON. There is a complete—let me see, now. How is it. I would say there is a complete ban on all trade or financial transactions with China, except under specific license of the Treasury Department. And this includes indirect trade as well.

That is, goods of Chinese Communist origin.

Mr. TAFT. This is a statutory restriction?

Mr. JOHNSON. It is based on—gee, this goes back so far, I forget. It is based on statute, but——

Mr. TAFT. The Battle Act?

Mr. FINDLEY. I think it is an Executive order.

Mr. JOHNSON. It is based on the Trading With the Enemy Act, I know, but I am under the impression the actual designation of China as such is an executive action.

Mr. FINDLEY. This relates to the Korean war?

Mr. JOHNSON. Yes, it goes back to the Korean war. It goes back to 1950, I know, to the Korean war.

Mr. TAFT. Are the restrictions particularly effective?

Mr. JOHNSON. Oh, I think they are very effective as far as U.S. trade is concerned. I think except for a trickle of, you might say, smuggled goods, or diverted goods, there is no U.S. trade; no.

Mr. TAFT. Do you think that if they were removed, there would be a gradual buildup of trade?

Mr. JOHNSON. I don't think so, initially. I don't think so, initially. I wouldn't want to predict over the longer period.

In that connection, I may point out that Japan, of course, has no restrictions, except the COCOM strategic goods export restrictions on trade with China, and whereas for a time, their trade built up somewhat, it was always very small. Last year it went down quite sharply.

Mr. TAFT. Do you read any special meaning into the sudden airing of the border disputes between China and Russia?

Mr. JOHNSON. It is very hard. We have speculated a great deal on this, and it is very hard to arrive at any real conclusion as to why both of them have apparently taken almost the simultaneous initiative to air this. [Security deletion.]

Mr. TAFT. Yes.

Mr. JOHNSON. I frankly don't have myself, and I haven't heard any really good thesis on why they have done this at this time. [Security deletion] there have been previous incidents in the past [security deletion]. These were the first ones that have been publicized.

Mr. TAFT. Do you think it is aimed at U.S. or world opinion?

Mr. JOHNSON. [Security deletion.]

Mr. TAFT. Moving to another problem that we are going to have here again, I am sure, I would like to hear from both Secretary Johnson and Secretary Nutter on the subject, do you have any particular thoughts or recommendations with regard to the Conte-Long amend-

ment? And what its effect has been? Has it had any practical adverse effect in the past, and do you see any particular approach we ought to make, if it is kept, or there are some amendments to it, for instance, that ought to be considered?

Mr. JOHNSON. I am reluctant to give an off-the-cuff reply to that. In general, we in the executive, of course, are always reluctant to see our freedom of action in these foreign policy situations circumscribed, yet at the same time, I full well understand the motives and the impulses that lead to the adoption of the amendment.

And I would not be prepared to say off hand that the amendment having been adopted, that it should now be repealed. I think it has possibly had some useful effects, but in general, I think that the use of aid as a direct political weapon is pretty limited in many of these situations.

And sometimes, it may be counterproductive.

Thus, in general, I am inclined to having the widest possible flexibility on how we deal with these various situations, rather than being limited.

Mr. TAFT. Well, it does cut into your flexibility; doesn't it?

Mr. JOHNSON. Pardon?

Mr. TAFT. It certainly cuts into your flexibility?

Mr. JOHNSON. It does; that is why I say in principle, it does cut into our flexibility. In that sense, I regret to see it, but on the other hand, it having been adopted, I am not sure how it would be interpreted if it were removed, and I simply am not prepared to give an off-the-cuff answer on it. I just haven't considered it enough.

I would frankly feel that it would have been better if it had not been adopted, perhaps, at the time, but it having been adopted, we now have a new situation.

Mr. TAFT. Secretary Nutter.

Mr. NUTTER. Congressman Taft, in the very short time I have spent reviewing some of our policies and attempting to help formulate some others, and to make decisions, I have already encountered difficulties that I believe this amendment does impose in carrying out important and legislative policies for our national security; but I wouldn't want to propose, just as Secretary Johnson doesn't want to propose, an outright amendment or a dropping of this particular legislation. However, I think it might be very wise to examine the effects of the legislation to date if you in the Congress are interested in seeing whether or not there might be some modification that would be more conducive to promoting a sound policy for the United States, without at the same time conflicting with some of these political objectives that are suggested.

Mr. TAFT. I might say that I certainly would welcome some comment from either or both departments on this subject, as this problem is going to be before us again. I suppose, in the military end, one question you could ask immediately is whether various military training programs that may be in existence or might be brought into existence might automatically be cut off by this amendment, because of a move toward sophisticated weapons on the part of some developing country.

Is that what you had in mind?

Mr. NUTTER. Yes: I am informed that the amendment has rarely been invoked up to this point, but that it has indirectly affected certain various delicate negotiations and situations.

Mr. JOHNSON. My staff remind me that we are doing a study in this, in the Department now, with the view of formulating our views on this. I participated in a brief discussion on this, and the reason for the hesitancy of my answer was that I heard in that discussion, even, various conflicting views on how it should be handled, now that it has been enacted.

But we probably will be submitting views on this.

Mr. TAFT. Thank you very much.

Just one other sort of general philosophical question, Secretary Johnson, coming from your statement.

You made a statement that several of our other witnesses have made here, and I have questioned the basic premise at times, saying that "lack of security, lack of stability is basically the product of economic backwardness, social upheaval and political unrest. The lasting solution to a secure and stable world environment can only be found in the cure of economic ills, in an orderly pattern of social change, and in the local, regional and worldwide political and institutional structures that facilitate peaceful change and adjustment."

Do you think that mere economic progress in the underdeveloped countries is necessarily going to lead toward stability?

Mr. JOHNSON. Oh, not at all.

Mr. TAFT. Conducive to a peaceful world?

Mr. JOHNSON. Did I say just economic progress?

Mr. TAFT. No.

Mr. JOHNSON. I didn't intend to say that.

Mr. TAFT. But I somewhat got that feeling about it.

Mr. JOHNSON. No: I don't feel it at all. I think that all these things have to go in step, and certainly economic progress alone is not the sovereign remedy for all the problems.

Mr. TAFT. Yes, if you said that, you would be or are in disagreement with Secretary Nutter's statement that was quoted earlier, about fat Russians not necessarily being happy Russians.

Mr. JOHNSON. I think Pakistan is a good example of that. On the economic side, Pakistan has been making good progress [security deletion] and, of course, we have had the instability there of the past months, and yesterday, the resignation of Ayub, and the considerable amount of disorder in the country.

No, I certainly agree that economic progress in itself is certainly not the sovereign remedy for the world's ills, but it is an element. It is an element.

Mr. THOMSON. Will the gentleman yield there?

I saw that statement also, and I thought maybe you were making an indirect advocacy of greater aid.

Mr. JOHNSON. No: I wasn't. Aid is only, again, one element. I think that aid is only marginal in most of these situations.

Mr. TAFT. I have completed my line of questioning anyway, Mr. Chairman.

Thank you very much.

Mr. ZABLOCKI. The committee, gentlemen, has received testimony that programs of nuclear powerplants abroad have caused an accumu-

lation of plutonium. The plutonium could very well be used for weapons purposes.

What are the implications of this for U.S. security in view of the limitation of the Safeguard system. What are the dangers of the use of plutonium that will be available to many underdeveloped countries in the future, for weapons purposes? How does this affect U.S. security?

Mr. JOHNSON. Well, I would say, Mr. Chairman, that this simply points up the great importance of the Safeguard system.

As you know, in all the reactors, both experimental and power reactors that we have sold abroad, we have insisted upon safeguards. First, bilateral safeguards, but with the formation of the IAEA, we moved toward the IAEA safeguards, and there is nothing you can really do about this, except to do all you can to assure that there is a safeguard system which, though having no police powers in itself, will at least alert you to the situation in which plutonium is being possibly diverted to weapons uses.

Fortunately, plutonium also has peaceful uses. It is useful in reactors as well, and it takes a fairly major industrial operation to separate out the plutonium from used fuel elements, so it is not something that can be done in backyards. It is something that requires considerable industrial capacity, and the safeguards systems that have been devised, and which are now adopted by the IAEA, our experts tell us are effective.

They can tell whether or not something is being diverted. But there is no question that with the growth of the peaceful uses of nuclear energy, the amount of plutonium being produced in the world is going to increase, and thus the magnitude and the effectiveness of the Safeguard system is going to be increasingly important. We know of no other approach to the problem.

Mr. ZABLOCKI. Well, your statement is most heartening, because earlier witnesses had stated that conversion is not a major industrial project, but that in a relatively simple operation plutonium can be used for military purposes.

Mr. JOHNSON. Well, if you have the plutonium, it can be used, but separating the plutonium—plutonium comes, as I understand, and I am not an expert in this field, but when you have used fuel elements—you have fuel elements in a power reactor—when they are used, you reprocess them, and in that reprocessing the plutonium is separated out from the U–235 as I understand it, and it is this process, of separating this out, your chemical separation plants, this process of separating the plutonium from the U–235 is a fairly major industrial process, I am told.

It is not in the order of gaseous diffusion plants for producing U–235, but it is a big plant.

Now that does require a big plant. Now once, though, you have the plutonium separated out, then the turning the plutonium into a weapon, as I understand it, is not a major process.

So it is at the point of the separation that you have to follow the plutonium, and observe it.

Mr. ZABLOCKI. But you are satisfied there are safeguards?

Mr. JOHNSON. Well, you know, it is always hard to say what is sufficient and what is not sufficient. All I can say is that our tech-

nicians, scientists, Atomic Energy Commission, who are the experts on this field, feel that the IAEA safeguards are effective.

Mr. ZABLOCKI. Dr. Nutter, it is my understanding that you expressed certain reservations about the nuclear nonproliferation treaty, and would you enlighten the subcommittee about your position on that question?

Mr. NUTTER. Mr. Chairman, I am not aware of any reservations that I have stated in any kind of public context, other than perhaps some remarks that I may have made or some reactions I may have had as a private citizen.

I agree that the treaty is an important step forward toward inhibiting nuclear proliferation and reaching broader and more enforceable arrangements with the Soviet Union. [Security deletion.] I did not have any reservations as to approval of the treaty, but simply that we should view the significance of it in this particular light. [Security deletion.]

Mr. ZABLOCKI. Thank you, Doctor.

During the hearings, and of course, in many current reports and publications, the price of U.S. involvement in international armed conflicts has been discussed. The cost of involvement, the price, has gone up.

For example, in comparison of the Vietnam conflict with Korea, and the price of our assistance in any conflicts in the future would be expected, of course, to continue to rise.

Now, if this is the case, would the U.S. Government be well advised to try to limit potential liabilities arising out of our defense commitments to other countries?

For example, shouldn't the United States begin to reexamine our bilateral mutual defense treaties?

For example, we have a security treaty with Liberia. Isn't this essentially a one-way street, which could prove very, very expensive to the United States? Particularly if other countries would want similar U.S. commitments?

Is it true that bilateral treaties may delay the very development of more satisfactory regional security arrangements? This, of course, is of great concern. In the event of a real trouble in Liberia, U.S. involvement, pursuant to a mutual defense treaty, could put the United States in direct conflict with the interests of other powers: France, Great Britain, Russia, even Red China, in Africa.

Would you care to comment, gentlemen?

Mr. JOHNSON. Well, that is a pretty big subject, Mr. Chairman.

First, I think that we should continually examine our relationships, both bilateral and multilateral. I have no question about that.

In these situations, whether you have a treaty or don't have a treaty, you are always faced with the problem of whether it costs less to do something at this particular point than to wait until you have to do something more at a later stage. You always have to balance these things out.

And, we certainly should seek to keep our maximum freedom of action. But I think treaties—I am not addressing myself to the Liberia Treaty—I think our security relationships around the world have pretty well proven to have been valuable in moving toward creating the kind of a world environment we are talking about.

Now I don't think our bilateral or our multilateral treaties are immutable.

For example, in Asia we have a number of bilateral treaties. My own hope and ambition with respect to Asia is that over a period of time, there will emerge a greater sense of regionalism, a greater sense of multilateralism among the countries of the area, and that eventually, Asia will involve something itself, directed to its own security needs as they may appear at the time, but within which we can associate ourselves, possibly, if they want us to associate with them, rather than being involved in these bilateral arrangements, but I think this is a process that is going to take place over a period of time, and nothing that is going to happen very suddenly.

Mr. ZABLOCKI. Dr. Nutter.

Mr. NUTTER. Yes, sir.

Mr. Chairman, I think first of all that the success of any treaty system should be measured by how infrequently it has to be invoked, rather than by its effectiveness once anything happens.

The purpose of the treaty system is to preserve the peace, and not to provide for a particular means for fighting wars, although that, of course, is the deterrent which one hopes the treaty system will provide.

That, I think, is fairly obvious, and in that sense, one would hope that the treaty system would be constantly appraised in those terms, as to how effective they have been in deterring violence in the world. From that point of view, it would certainly seem to me sensible that we appraise the system that we have. I am not suggesting any specific changes in that system because I am not that well aware of its faults.

The problem is to provide for better alternatives. From that point of view, I feel that a careful review is certainly always in order, and particularly at certain junctures. [Security deletion.]

Mr. ZABLOCKI. You would include, of course, countries that we do not necessarily have security treaties with, in this review. For example, Spain. It is my understanding that there is some difference of opinion between the State Department and the Defense Department on the need of Spanish bases.

How essential do you believe those bases are for American national security interests, Dr. Nutter? Or is there any——

Mr. JOHNSON. May I interject at this point?

I have been dealing, as you have seen in the press, with the Spanish base question. Let me say I am not conscious of or aware of any differences between the two departments on this. We accept in the State Department the fact that our bases in Spain are important. There are no absolutes in these fields. You can't say one thing is essential or not essential.

There are various degrees of importance, and having examined the situation with Defense—and they have made very careful studies of this—I am satisfied it is important, and desirable, that we have those bases in Spain, but not at any price. I know the Department of Defense would say not at any price. If we can get them at a reasonable price.

And it is my hope and expectation that we are going to be able to continue our tenure there for the next 5 years that the agreement has to run, at what we—and I hope the Congress—will feel is a reasonable price.

Mr. ZABLOCKI. Would you say further, Mr. Secretary, that charges are unfounded, that the Department of Defense has been too involved

in making United States foreign policy for the past several decades.

Mr. JOHNSON. I personally don't feel it, as you know; my work over the last 20 years back here in Washington, I have maintained very close relations with the Department of Defense and as a matter of fact, I think we tend to find bigger differences within the Departments.

I think the Department of Defense will tend to find bigger differences within itself, and we will tend to find bigger differences within State on some of these things, than we find between State and Defense, if you will.

I feel that we have developed a very healthy relationship of mutual confidence and respect between State and Defense on the whole. I have devoted a great deal of my efforts toward this end, and I feel that there has certainly been a great response over in Defense on this, and we do work together very closely—not along lines of bureaucratic conflict between the two Departments, but genuine searching for what we each feel is our best national interest.

Mr. ZABLOCKI. Since we are discussing this very subject, another question comes to mind.

Does the revival of National Security Council help or hinder the State Department in carrying out its responsibilities?

Mr. JOHNSON. It doesn't present any problem. Each President works in his own way. This is my third change of administration on which I have been involved in Washington, and I think we in State have always found it possible to accommodate to whatever way the President wants to work.

We recognize that he is the boss, and he is particularly the boss when it comes to foreign affairs, and we make work whatever system he wants to work. And I think the present system is working very effectively.

I have no problems or complaints with it myself.

Mr. ZABLOCKI. I am sure you can detect that there is some concern on the part of this committee, and Members of Congress, as to whether the prerogatives of the State Department are being taken over by other agencies.

Mr. JOHNSON. I am not worried about that. I am not worried about it.

Mr. ZABLOCKI. Governor Thomson?

Mr. THOMSON. No.

Mr. ZABLOCKI. Mr. Taft?

Mr. TAFT. No, sir.

Mr. ZABLOCKI. If I may just ask one final question, then, on a matter that we are very concerned about, what steps are being taken to resolve the growing crisis in the Trust Territories of the Pacific?

Is the strategic value of the islands being fully taken into account, particularly since they are administered by the Interior Department?

It is my understanding that the Marianas District Legislature has passed a resolution inviting the Soviet Union to come to their assistance, and they are a bit obviously disturbed about the attention and assistance that they have been receiving from the United States.

Mr. JOHNSON. May I say that [security deletion] we are seeking, and I think will shortly be announcing, a program of action on this, that we hope will be helpful.

We entirely agree on the urgency of the problem.

Mr. ZABLOCKI. The loss of the Marianas, the Carolines, or any part of the Micronesian area to some presence of the Soviet Union would certainly put a real dent in our national security, would it not, Doctor?

Mr. NUTTER. Yes, sir, Mr. Chairman.

I have been made aware of this problem, very quickly, on assuming office, and I can assure you that it is receiving urgent attention. I am not able to analyze at this point exactly why the difficulties have arisen, and what the causes are, or what ways they might be resolved; but it is something to which we are giving considerable attention, and hoping to do something about it.

Mr. ZABLOCKI. And a final, possibly a windup question, one of our witnesses has stated that despite scientific breakthroughs, technological developments, and military progress, U.S. treaties can remain as they are. There is no need to change them, because basically it is cooperation and living up to the treaties by all the countries involved, which is the essential point, and therefore, there is no need to revise them dramatically.

Would you agree?

Mr. JOHNSON. No immediate change needed to revise them dramatically, that I can think of. I rather would look upon it as I said previously as a process of evolution, and not so much because of scientific and technological revolution as the political developments, and I am talking about the Far East.

I see a change over a period of time taking place in our relationship, security relationships out there, as a greater sense of regionalism and institutionalism of that regionalism develops out there.

Mr. ZABLOCKI. Dr. Nutter?

Mr. NUTTER. I think I would agree, Mr. Chairman, with what Secretary Johnson says. I don't believe that there are sudden and abrupt changes which make it necessary to make sudden dramatic changes in treaties; but things do happen, over a period of years, begin to accumulate, and the existing arrangements obsolesce. We must constantly be on the alert to revise them at an appropriate time, and I think this need is occurring probably in the Asian area [security deletion]. These are matters to which we are giving, I hope, more and more attention, always mindful that we follow the leadership of the State Department on these matters.

I want to thank the Secretary for suggesting that we have not irresponsibly intruded in foreign policy matters, and to state that I will certainly make every effort to stay within the bounds of my own responsibilities even though they extend abroad because we are charged with national security and must advise on these matters. I think we will have suggestions to make on many of these matters, and that they will enter into the proper channels.

Mr. ZABLOCKI. Let us pick a specific issue that was dealt upon here earlier, and that is, the ocean seabed, and the Continental Shelf. The problem of determining to what extent any particular country has jurisdiction within a particular offshore area, the territorial limit as far as the surface of the water, is being revised, reviewed, and studied at the present time, it is my understanding.

Mr. JOHNSON. That is correct.

Mr. ZABLOCKI. I might say this committee would be delighted to be advised as there is progress being made in this regard and in other of

the technologically related issues on which revision is being studied and considered, so we can keep in step with the executive branch in the progress that is being made.

Mr. JOHNSON. I will undertake to see that is done.

Mr. ZABLOCKI. Any further questions?

Thank you, gentlemen. It was a very interesting morning.

Thank you again.

Mr. JOHNSON. Thank you, Mr. Chairman.

Mr. ZABLOCKI. The subcommittee stands adjourned.

(Whereupon, at 11:55 a.m. the subcommittee adjourned.)

APPENDIX

WRITTEN STATEMENT TO THE SUBCOMMITTEE ON NATIONAL SECURITY POLICY AND SCIENTIFIC DEVELOPMENTS BY DR. ZBIGNIEW BRZEZINSKI, RESEARCH INSTITUTE ON COMMUNIST AFFAIRS, COLUMBIA UNIVERSITY

(1) With respect to the future of alliances, let me say in general that it is important to think of the problem in historical perspective. In the past, alliances were created to wage war. They normally dissolved after the conclusion of hostilities. In the more recent past, they have been constructed to assure mutual security by deterring war. They have endured because of the overriding fear of member states that war may erupt and that an act of aggression may occur.

(2) It is not certain, however, that this motivation will suffice for keeping alliances together and the international system stable. Increasingly, alliances must be used in order to create a framework of international security and growing cooperation. Accordingly, it behooves particularly the West to take advantage of the existing alliance structures to seek ways of establishing at least preliminary security links with the other side, particularly between NATO and the Warsaw Pact nations. Eventually, the creation of a European Security Commission, an initiative which I proposed more than a year ago, could become an outgrowth of the presently confronting alliance systems, thereby enhancing the overall security of the nations concerned.

(3) I am convinced that efforts to that end would provide more solid public opinion support for NATO than emphasis on NATO as an essentially military-political defense organization, poised to deter Soviet aggression. The additional element of constructive engagement would help in mobilizing broader popular support, and would give an additional stimulus for the continued vitality of the NATO organization.

(4) Our eventual goal must be the creation of a community of the developed nations, as the hard core of a more stable international system. Our thinking about alliances must be geared to that end.

(5) Similarly, in Asia we should not allow ourselves to become wedded to a security concept that is inherently anti-Chinese, nor adopt a pro-Soviet stand in the Sino-Soviet dispute. Striving to improve relations with each will help our interests in regard to both.

(6) Finally, it is important to recognize that the construction of a secure international system will require both the active cooperaion of all parties concerned and he simultaneous maintenance of their individual sense of national security. The current discussion on the ABM system has to be seen in that light. While I am not in a position to make a scientific judgment concerning its actual military utility, I am prepared to argue—on the basis of my understanding of Soviet politics and international affairs—that the recent decision to deploy such a system in the United States will not adversely affect American-Soviet arms control negotiations. Indeed, it may make it more possible for both sides to freeze and eventually limit their offensive deployments without becoming exposed to third party threats.

(The following statement has been submitted for inclusion in the hearings:)

STATEMENT OF ALBERT WOHLSTETTER, PROFESSOR OF POLITICAL SCIENCE, UNIVERSITY OF CHICAGO, AND CONSULTANT TO THE RAND CORP.

BASES AND THE REVISION OF POLITICAL CONTROL IN OKINAWA

I. SUMMARY OF ONE AMERICAN VIEW

Let me begin by stating in a very summary way my own views as to the problem of bases and the reversion to Japan of political control in Okinawa. There are ten points.

I believe first that the U.S. and Japan should agree this year on an early reversion to Japan of political control over Okinawa. Second, American military base rights in Okinawa should be subject to the same sort of restrictions as are the bases in the main islands of Japan; the U.S. and Japan should conclude an agreement this year on the timely introduction of such restrictions. Third, just as the base operations now permitted in the main islands of Japan contribute to the security of both Japan and the U.S., so do the parallel operations in Okinawa, i.e. those that would continue to be permitted under the same rules.

As for the restrictions, the Kishi-Herter exchange of January 19, 1960 specified: "Major changes in the deployment into Japan of United States armed forces, major changes in their equipment, and the use of facilities and areas in Japan as bases for military combat operations to be undertaken from Japan other than those conducted under Article V of the said Treaty, shall be the subject of prior consultation with the Government of Japan." This passage has been interpreted to imply two principal restrictions:

(1) "The phrase 'major changes in equipment,'" according to John Emmerson, "is understood as referring to the introduction of nuclear weapons." *

(2) The "combat operations . . . other than those conducted under Article V" appear to be operations launched directly from bases inside Japan into combat outside of it and not directly in response to an armed attack against territory administered by Japan. B-52 sorties into Vietnam would be an example.†

I believe, fourth, that with respect to the first restriction, changes in the technology of weapons delivery and in techniques of control and logistic support have diminished and will continue to diminish the value of potential nuclear operations from close-in. This, and the availability of other alternatives, leave only marginal importance to possible nuclear operations on Okinawa, i.e. to the actual or potential presence of "the major equipment" that is excluded from the main islands of Japan. Fifth, much the same can be said of the conventional combat operations permitted from Okinawa without prior consultation, that require such consultation if launched from elsewhere in Japan; their value is small compared to the worth of military activities permitted in the rest of Japan and to the worth of the parallel military activities in Okinawa—those permissible under the same constraints; and very small compared to their likely political costs.

Sixth, while American bases in Okinawa and in the rest of Japan will continue to have a great value for mutual defense, changing technology should enable a more or less steady reduction over time in the U.S. peacetime presence in Japan. Seventh, the Japanese capability for conventional self-defense should be expanded as rapidly as is politically feasible so that Japan may take an increasing proportion of its own defense burden. Eighth, U.S. participation in discouraging or defending against attack on Japan will continue to be of great importance for the security of both countries; this is in particular true of the U.S. nuclear guarantee of Japan against nuclear attack. Ninth, for this reason it is important to make clear that any future reduction in the kinds and quantities of U.S. forces, operations, and facilities in Okinawa and elsewhere in Japan is not a diminution in the capacity to defend Japan nor in the U.S. interest in the security of Japan. We should make clear on the contrary that it is a response only to changing technology and to the increased capability of Japan for self-defense.

Tenth and finally the diversity of views on these matters within Japan and also within the U.S. makes it important to hold bargaining on these matters within narrow bounds. Negotiating maneuvers by either side can induce domestic pressures on each that may interact explosively, weaken cooperation, and lead to a net reduction in the security of both countries.

On my view it is crucial that we make a distinction between the question of the reversion of political control in Okinawa and the question of the value to both countries of American military bases there operating under the same restrictions as prevail elsewhere in Japan. Administration by the U.S. seems important only if unrestricted operations are a *sine qua non*; but the value of unrestricted operations in Okinawa in the 1970s is exaggerated. It is not a case of all or none.

II. THE MANY VIEWS IN THE UNITED STATES AND JAPAN

I would stress that my view is only one American view. It has no official standing and there are a great many unofficial views on this subject in the United

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*John K. Emmerson, "Japan: Eye on 1970," *Foreign Affairs*, Vol. 47 (January 1969), pp. 348–362.

†*Ibid.*, p. 29, May 1968, Washington, D.C.

States, just as there are in Japan. As for official views, the Nixon administration is not yet in office as of the time of this writing and is hardly likely to have formulated a new position by the date of the Conference. The position of the Kennedy and Johnson administrations was expressed in the annual Budget messages to Congress. For many years these messages said, "To protect the security of the free world, the United States will continue responsibility for the administration of the Ryukyu Islands as long as conditions of threat and tension in the Far East require the maintenance of military bases in the islands." Though the United States recognized the residual sovereignty of Japan in Okinawa, this sentence, repeated in the Budget messages, appears to say that so long as military bases of any kind are required in the Ryukyus, reversion would have to be deferred. This is very different from the view I have expressed—that bases in the Ryukyus even if operated under the restrictions prevailing elsewhere in Japan, will have a continuing value for the mutual defense of both countries.

Furthermore, a good many unofficial American statements amount to the same as this official position. Special Report No. 7 on *United States-Japanese Political Relations* of the Georgetown University Center for Strategic Studies, states, for example, that it is "barely conceivable that the Ryukyuan bases can retain some U.S. operational significance under Japanese administration."* And even scholars with quite different strategic and foreign policy points of view have suggested that a solution for Okinawa depends on either a decline in the need for bases there or a change in Japanese attitudes permitting nuclear weapons there after reversion.

Views in the United States as in Japan vary as to the existence, nature and extent of military threats in Asia, the common and the divergent interests of the United States and Japan, the role of military force in discouraging or repelling such threats, the identity of potential adversaries, the contingencies in which such potential adversaries might become actual, the various roles played by bases in deterring or fighting or limiting the damage done in various potential nuclear or non-nuclear conflicts. I stress the fact that there are many views in my country as well as in Japan, not simply to make clear the limited authority of anything I have myself, as an analyst of base systems and foreign policy, to say on this subject, but also because I believe the divergence of domestic views in both countries limits what our governments are able to do; and in the United States this may be increasingly true. Neither government is perfectly free to take the steps it may consider most rational in its country's interests. Even where members of the government themselves are united in agreement as to what would be optimal, each government may have to settle for less. Moreover there are on both sides some extreme non-governmental or unofficial views of a nationalist or isolationist character—an urge to escape from foreign pressures, a turning inward toward an exclusive concentration on domestic problems, a wishful desire for safety either in unarmed neutrality or in a purely national self-defense. In the worst eventuality some such view might become more prominent.

This danger seems to me to be large if hard bargaining by governments for nonessentials provoke an interacting and cumulative series of dissents or resentments on both sides. One can imagine a sequence in which Americans, resenting the lopsided responsibilities they feel they have for the common defense of Japan and the United States, and the greater drain on American resources than on Japan's, might insist on the essentiality of unrestricted base rights in Okinawa—though I believe the freedom from restriction is marginal in importance. Many Japanese might resent what they feel is a lopsided authority and control of the common defense by the United States—and their dependency; others more extreme may regard the American alliance as a source of danger rather than protection. Delay in the transfer of sovereignty over Okinawa to the Japanese might then lead to protests in Japan and Okinawa, perhaps something of the sort that occurred at the time of the 1960 treaty renewal. With the difference, however, that the mood in the United States has changed. There is the new isolationism and we have an upsurge of our own extremist wing of *kakushin interi*. The New Left in the United States conceivably might reflect the Japanese extreme; and on the other hand Congressional opinion might react sharply to criticism of the United States as a sign of "ingratitude." One can see powerful persons taking the position of all or nothing, that is, all the present base rights in Okinawa, or nothing. An older sort of isolationism might reinforce the new one. And the cumulative result might be not merely to lose

*P. 29, May 1968, Washington, D.C.

restricted as well as unrestricted base functions in Okinawa, but a great weakening of the alliance itself—and an increase in the common danger.

III. MORE ON KEY ISSUES

Military dangers and the need for defense

There are of course some who doubt the existence of military dangers, or believe they are provoked by our own preparations to defend against them, or feel they can be handled by an extension of UN peace-keeping forces. Even if we reject such views as wishful, and, at the present stage of history, utopian, it is worth noting that a great many more realistic scholars or analysts hold today that the threat of war from a major or large power such as Russia or China has greatly declined, and that the troubles that might be started by smaller powers like North Korea or North Vietnam are much less threatening and possibly negligible. Some regard the primary contribution to peace and stability as likely to be made by aid to economic growth.

I am most definitely in favor of assisting in the economic development of the less developed countries, but I doubt that this is a substitute for military defense against military dangers or that in fact it has any direct, easily decipherable connection with peace and stability. On the contrary there is a good deal of evidence that rapid economic growth may be destabilizing, at least as far as internal order is concerned, and possibly also on the international scene. Internal and external disorders may sometimes be linked: one sort of disorder may make a country vulnerable to the other and, so far as foreign aggression is concerned, domestic troubles may prompt foreign adventures or they may unfit a country for awhile for anything but domestic preoccupations, as many China hands believe today about Communist China. I am by no means certain myself that China will continue indefinitely to be too busy with its domestic strife to have the interest or ability to cause trouble to its neighbors or even to some more distant countries. In particular, the development of a Chinese nuclear force will make them able, even while busy at home, to do quite a lot of harm (or to threaten harm by way of coercion) unless it is countered by an opposing nuclear capability.

In evaluating the implications of a reduced threat from Russia, it is important to keep in mind that the probability of aggression is a conditional probability. It is conditioned on what the response to aggression may be. There is a problem of circularity here. We say that the probability of aggression is low, and perhaps therefore bases are less necessary. But the probability of aggression has been made low in good part because it would be countered; and bases has played a role in making such a counter effective. If we reduce the availability of bases below some threshold because we think the danger has receded, the danger may grow.

Finally, the dangers evoked by lesser powers are not completely separable from the larger dangers they may bring on through the intervention of hostile major countries or the expansion of the influence of those countries. The uncertainties are very large, and it is clear that military force is by no means an adequate response to these dangers. But it is necessary and military bases of one sort or another will for some time to come have a substantial role in keeping peace.

The diminishing role of close-in bases in nuclear war

A decade ago close-in nuclear bases played a large and indispensable role in the deterrence of nuclear attack. The greater part of the American retaliatory force was made up of manned aircraft of medium range and even the longer range aircraft would have required at the least some ground refueling after they had struck at targets and in some cases on their way there. This situation has altered drastically. Most of the force is made up of missiles that can be launched from the continental United States or from ocean areas to distant targets. And the smaller manned bomber portion of the force has a much extended range. Overseas bases, even at the time, were open to a much wider variety of attacks with larger payloads and greater accuracies and with much less warning than bases inside the United States. The vulnerability problem, if anything, may have worsened for overseas as compared to bases at intercontinental range. For such reasons overseas bases have played a sharply diminishing role in strategic deterrence.

It has been suggested that even vulnerable nuclear bases close in would make an important contribution to nuclear deterrence by providing warning of a nuclear attack. It was held that such bases presented a prospective attacker with

an insoluble dilemma. Either the overseas nuclear bases would be attacked first and so provide extra warning to the continental United States, or they would be left untouched and therefore able to retaliate and disrupt an opening enemy salvo. A potential nuclear base at Okinawa was used as an example. In fact the dilemma such bases were supposed to present to an attacker is not a real one. I have elsewhere examined this claim in some detail, on the basis of public data.[1] And vulnerable nuclear bases overseas are not a valid way of assuring warning.

(On the other hand an overseas base such as Okinawa might perform a very useful function in detecting a nuclear attack if an adequate sensing system were located there. Such sensors, however, are not themselves nuclear and raise none of the political problems attached to nuclear installations.)

For the purposes of deterring nuclear war, then, overseas basing of nuclear vehicles has a sharply reduced importance. In case deterrence fails, it has seemed in the past that nuclear strikes launched from overseas, because they would start from close by, would have an advantage in more quickly spoiling an enemy attack and so limiting the damage an enemy might do to Japan or to the United States.[2] However, this potential function too has declined in importance over time with the great increase in speed, weight and precision of nuclear attack from far off. At the same time other close-in alternatives, both sea- and land-based, have become available. Then given the increase in both distant and close-in alternatives, the importance of being able to perform this function at Okinawa is greatly diminished.

Similar comments apply to the potential function of Okinawa as a possible site for storing short-range battlefield weapons for use elsewhere in the area. It is clearer now than it was ten years ago that there are very few contingencies in which one might need to use such battlefield weapons in large numbers; there appear to be alternative sites in the North Asian area where they might be stored in sizable numbers without comparable political problems, at the very least on ships; and faster modes of transport have reduced the time needed to lift weapons to the battlefield.

As the result of such developments it is my view that so far as any potential presence of nuclear weapons on Okinawa is concerned, in the 1970s there will be more than enough redundancy in our land and sea based system as a whole to make this politically explosive operation quite dispensable. Sensing systems for detecting nuclear attack would be valuable but should raise no political problems.

The more slowly changing role of bases in non-nuclear war

For operations during a possible extended non-nuclear war, close-in bases are clearly essential. And peacetime operation, maintenance and stockpiling have been and will continue to be of great importance. However, the extra value of being able to conduct conventional combat operations "without prior consultation" seems to me to be extremely limited, in the realistic contingencies that one might contemplate in the area. The wartime uses that are important are likely to be important for both Japan and the United States; and quite unlikely to be undertaken without consideration.

The growth of high speed air transport like the C–5 and the C–141A, developments such as the Fast Deployment Logistic Ships, the vast increase in capabilities for control and communication, should make possible a continued, gradual reduction in the peacetime presence overseas of American conventional forces and their support functions. In fact, this would continue a process which has been going on for some time. For example, a recent Japanese publication has displayed the decline in number of American troops from 260,000 in 1952 to 87,000 in 1957 to 48,000 in 1960 and 34,000 in 1966. The number of "bases" declined in those years from 2,824 to 458 to 243 to 147.[3]

Bases as Hostage of U.S. Commitments

Foreign military forces are likel yto be a source of friction, culture conflict and even animosity in the host country. This is true even when the force belongs to an ally and even when it is essential for the host country's defense. But such an allied presence, even if we neglect the essentials of its operational contribu-

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[1] See "On the Value of Overseas Bases," Rand publication P–1877, January 5, 1960.

[2] *Ibid.*, p. 16.

[3] Tomohisa Sakanaka, "zainichi Beigunkichi no Genjo to Shorai" ("The Present and Future of the American Bases in Japan"), in *Shorai no Anpotaizei to Nippon (The Future Security System and Japan)*, Tokyo, Asahi Shimbunsha, 1968. (I am indebted for this reference to my student, Mr. Hideo Sato.)

tion to the common defense, serves also as a useful signal to a potential adversary and possibly also as an assurance to the host. It is a signal not only of a capability to resist military attack, but of an interest in doing so, and an intention to do so. The presence of such force not only expresses an interest; it may increase the interest by raising the stake.

Any reduction in the allied presence conceivably may also be taken as a signal, a signal of a reduced interest. The West Germans seem much more conscious of this possibility then do the Japanese, perhaps even more than do the Americans. The pressures in West Germany and Japan often seem exactly opposite. Nonetheless the role of the American presence as signal should be kept in mind. We have reduced forces in Japan for many years. It is important that any further reduction in force size or in the number and kinds of facilities and type of operation carried on be generally understood as no sign of a lessening interest of the United States in Japan, and no sign of a lessening capability for their mutual self-defense. It is essential that they be seen as an adaptation to changing techniques, the availability of new alternatives and in particular the increased role of Japan in its own self defense.

IV. THE LOGIC OF POINT DEFENSE

Even where the interests of two countries coincide, it is sometimes possible and, in a narrow sense, strictly rational for one partner to let the other do more than its share in achieving the goals of both, to try, in short, to get "a free ride." The other partner may feel it has no reasonable choice. Some crucial interests coincide; others diverge, and one partner or the other may pursue the divergent ones. So Mancur Olson suggests in *The Logic of Collective Action*. However, this is a dangerous game for both sides. It presumes that each power can act with perfect rationality and control in its own interests while carrying the other on its back, and do this in the face of intense domestic criticism and dissent. And it presumes further on the other hand that only one will seriously attempt controlled and very hard bargaining to force the other partner to pay. Neither of these presumptions may be justified. The delicate negotiations for bases, and reversion of political control in Okinawa and the extension of the Japan-U.S. security treaty seem to be a case in point. My earlier comments suggest the dangers to each side of bargaining maneuvers that may get out of control.

I agree wholeheartedly with Mr. Kusumi on the importance to Japan and to the United States of negotiations that treat Okinawa and the sharing of defense burdens in long perspective with a strong emphasis on our common interests.

(The following memorandum has been submitted by the Department of State:)

STATUS OF TREATY FOR THE PROHIBITION OF NUCLEAR WEAPONS IN LATIN AMERICA (TREATY OF TLATELOLCO) AND ITS PROTOCOLS AS OF MARCH 20, 1969—REPORT FROM THE U.S. DEPARTMENT OF STATE

The Treaty for the Prohibition of Nuclear Weapons in Latin America (the text of which is set forth in the Seventh Annual Report of the United States Arms Control and Disarmament Agency) has been signed by the following 22 States:

Argentina (September 27, 1967).
Barbados (October 18, 1968).
Bolivia (February 14, 1967).
Brazil (May 9, 1967).
Chile (February 14, 1967).
Colombia (February 14, 1967).
Costa Rica (February 14, 1967).
Dominican Republic (July 29, 1967).
Ecuador (February 14, 1967).
El Salvador (February 14, 1967).
Guatemala (February 14, 1967).
Haiti (February 14, 1967).
Honduras (February 14, 1967).
Jamaica (October 26, 1967).
Mexico (February 14 ,1967).
Nicaragua (February 14, 1967).
Panama (February 14, 1967).

Paraguay (April 26, 1967).
Peru (February 14, 1967).
Trinidad and Tobago (June 27, 1967).
Uruguay (February 14, 1967).
Venezuela (February 14, 1967).

(Cuba has refused to sign and a question has been raised as to whether Guyana is eligible to sign under Article 25 of the Treaty.)

The Treaty has been ratified and entered into force for the following ten states:

Bolivia (February 18, 1969).
Dominican Republic (June 14, 1968).
Ecuador (February 11, 1969).
El Salvador (April 22, 1968).
Honduras (September 23, 1968).
Mexico (September 20, 1967)
Nicaragua (October 24, 1968).
Paraguay (March 19, 1969).
Peru (March 4, 1969).
Uruguay (August 20, 1968).

(Although Brazil has also ratified the Treaty, it has not taken the further action necessary to bring it into force for Brazil).

When the Treaty has entered into force for eleven states, it provides for a meeting of the parties to set up an international Agency for the Prohibition of Nuclear Weapons in Latin America, designed to implement and verify compliance with the Treaty.

There are two protocols to the Treaty: Protocol I, which is designed for states outside of Latin America which have territories within the zone and wish to bring such territories under the treaty; and Protocol II, which is designed for nuclear-weapon states who agree to respect the zone, not to contribute to violations of the treaty, and not to use or threaten to use nuclear weapons against parties to the Treaty.

Protocol I has been signed by the following states:

Netherlands (April 1, 1968), with a statement.
United Kingdom (December 20, 1967), with a statement.

(France and the United States have not signed this Protocol and no state has yet ratified it.)

Protocol II has been signed by the following states:

United Kingdom (December 20, 1967), with a statement.
United States (April 1, 1968), with the statement set forth in Appendix X to the Eighth Annual Report of the U.S. Arms Control and Disarmament Agency.

(France, the Soviet Union, and Communist China have not signed this Protocol and no state has yet ratified it.)

North Atlantic Council Meets at Luxembourg

The North Atlantic Council held its regular ministerial meeting at Luxembourg December 12–14, 1967. Following are texts of the final communique and annex which were released by the Council at the close of the meeting on December 14.

[Press release 295 dated December 15]

TEXT OF FINAL COMMUNIQUE

1. The first Ministerial Meeting of the North Atlantic Council to be held at the new Brussels headquarters ended on 14th December, 1967.

2. Ministers approved the report on the Future tasks of the Alliance, prepared in conformity with the decisions taken on 16th December 1966 on the initiative of the Belgian Foreign Minister.[1] The report is annexed to this communiqué.

3. The Council examined developments in the international situation since their last meeting. Ministers reviewed the efforts made by their governments to improve East/West relations and noted the extensive bilateral contacts made in

[1] For text of a communique and annexes issued at Paris on Dec. 16, 1966, see BULLETIN of Jan. 9, 1967, p. 49.

recent months. They expressed the hope that these efforts might lead to progress in the settlement of outstanding European problems. Ministers also discussed long-range policy questions, especially those covered in the report on Future Tasks of the Alliance.

4. The Council discussed proposals presented by the "North Atlantic Assembly" of Parliamentarians at their recent meeting for closer co-operation between themselves and the Council. The Secretary General was authorised to study ways and means for this purpose and to submit suggestions to the Council.

5. Ministers emphasised the important of promoting progress in disarmament and arms control, including concrete measures to prevent the proliferation of nuclear weapons. They reaffirmed their view that, if conditions permit, a balanced reduction of forces on both sides could constitute a significant step towards security in Europe.

6. The Council recalled the views expressed in the declaration on Germany issued on 16th December, 1966. Ministers emphasised that the peaceful settlement of the German question on a basis which would take account of the German people's fundamental right to re-unification was an essential factor for a just and lasting peaceful order in Europe. In reviewing the present state of the German question, Ministers were informed by their German colleague about his Government's increased efforts to improve relations with Eastern European countries and to promote East/West détente. He emphasised that it was in this spirit that his Government was also trying to handle the problems arising from the division of Germany. Considering the difficulties of reaching an early solution, Ministers agreed that a present the only realistic possibility for progress remained the step-by-step approach advocated and applied by the Federal Government. With regard to Berlin, the Ministers confirmed their declaration of 16th December, 1958.[2]

7. Ministers noted the Secretary General's report on his "Watching Brief" and invited him to continue his activities in this sphere. They expressed their appreciation of the important rôle played by the Secretary General in reducing the recent crisis concerning Cyprus and Greek-Turkish relations. They expressed satisfaction with the agreement between Turkey and Greece on the steps being taken to resolve the crisis, taking advantage, as appropriate, of the actions of the United Nations. They reaffirmed their conviction that Turkey and Greece should, in the spirit of the solidarity of the Alliance, continue their efforts to facilitate a peaceful and rapid solution of the Cyprus problem.

8. Ministers considered the report on Technological Co-operation prepared in response to the Resolution adopted on 14th June, 1967[3] on the initiative of the Foreign Minister of Italy. They invited the Council in Permanent Session assisted by competent organs of the Alliance to continue its studies on the Alliance's rôle in the field of technology, including the possibilities for applying defence technology to civil needs. The aim is to encourage co-operation between member countries and to contribute towards narrowing the technological disparities which may exist between these countries. Ministers also invited the Council in Permanent Session to develop the most efficient and economical ways for co-ordinating the various activities of the Alliance in the field of defense technology.

9. Ministers considered and approved a report on Civil Emergency Planning. Stressing the vital important of such planning, they noted the progress which had been achieved and the tasks which remained to be accomplished.

10. Ministers met as the Defence Planning Committee on 12th December 1967, to review the work accomplished since their previous meeting on 9th May 1967, and to give directions for future work.

11. They agreed that one of the foundations for achieving an improvement in East/West relations and a peaceful settlement in Europe must be NATO's continuing military strength and capability to deter aggression. In this connection they noted that the Soviet Union continues to expend increasing resources upon its powerful military forces and is developing types of forces designed to enable it to achieve a significant military presence in other parts of the world. They also observed that during the past year there has been a marked expansion in Soviet forces in the Mediterranean.

12. Ministers recalled that at their previous meeting they had given political, strategic, and economic guidance to the NATO Military Authorities for the de-

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[2] For text, see *ibid.*, Jan. 5, 1959, p. 4.
[3] For text, see *ibid.*, July 3, 1967, p. 15.

velopment of an up-to-date strategic concept and an up-to-date five-year force plan covering the period up to the end of 1972. They adopted the revised strategic concept submitted by the Military Committee following the first comprehensive review of NATO's strategy since 1956. This concept, which adapts NATO's strategy to current political, military, and technological developments, is based upon a flexible and balanced range of appropriate responses, conventional and nuclear, to all levels of aggression or threats of aggression. These responses, subject to appropriate political control, are designed, first to deter aggression and thus preserve peace; but, should aggression unhappily occur, to maintain the security and integrity of the North Atlantic Treaty area within the concept of forward defence.

13. Ministers also noted the force commitments undertaken by member nations for the year 1968, and for the first time adopted a five-year NATO force plan, covering the period 1968–1972. They gave directions for the development in 1968 of a force plan for the period 1969–1973 in accordance with the procedures for five-year rolling planning adopted in December 1966.

14. Ministers devoted particular attention to the Security of the flank regions of Allied Command Europe.

15. They decided to transform the "Matchmaker" Naval Training Squadron into a Standing Naval Force Atlantic of destroyer-type ships. This force, continuously operational, will enhance existing co-operation between the naval forces of member countries.

16. France did not take part in the discussions referred to in paragraphs 10 to 15 and did not associate herself with the corresponding decisions.

17. The regular Spring Ministerial Meeting for 1968 will be held in Reykjavik.

ANNEX TO COMMUNIQUE

Future Tasks of the Alliance

Report of the Council

A year ago, on the initiative of the Foreign Minister of Belgium, the governments of the fifteen nations of the Alliance resolved to "study the future tasks which face the Alliance, and its procedures for fulfilling them in order to strengthen the Alliance as a factor for durable peace." The present report sets forth the general tenor and main principles emerging from this examination of the future tasks of the Alliance.

2. Studies were undertaken by Messrs. Schütz, Watson, Spaak, Kohler and Patijn. The Council wishes to express its appreciation and thanks to these eminent personalities for their efforts and for the analyses they produced.

3. The exercise has shown that the Alliance is a dynamic and vigorous organization which is constantly adapting itself to changing coditions. It also has shown that its future tasks can be handled within the terms of the Treaty by building on the methods and procedures which have proved their value over many years.

4. Since the North Atlantic Treaty was signed in 1949 the international situation has changed significantly and the political tasks of the Alliance have assumed a new dimension. Amongst other developments, the Alliance has played a major part in stopping Communist expansion in Europe; the USSR has become one of the two world super powers but the Communist world is no longer monolithic; the Soviet doctrine of "peaceful co-existence" has changed the nature of the confrontation with the West but not the basic problems. Although the disparity between the power of the United States and that of the European states remains, Europe has recovered and is on its way towards unity. The process of decolonisation has transformed European relations with the rest of the world; at the same time, major problems have arisen in the relations between developed and developing countries.

5. The Atlantic Alliance has two main functions. Its first function is to maintain adequate military strength and political solidarity to deter aggression and other forms of pressure and to defend the territory of member countries if aggression should occur. Since its inception, the Alliance has successfully fulfilled this task. But the possibility of a crisis cannot be excluded as long as the central political issues in Europe, first and foremost the German question, remain

unsolved. Moreover, the situation of instability and uncertainty still precludes a balanced reduction of military forces. Under these conditions, the Allies will maintain as necessary, a suitable military capability to assure the balance of forces, thereby creating a climate of stability, security and confidence.

In this climate the Alliance can carry out its second function, to pursue the search for progress towards a more stable relationship in which the underlying political issues can be solved. Military security and a policy of détente are not contradictory but complementary. Collective defense is a stabilizing factor in world politics. It is the necessary condition for effective policies directed towards a greater relaxation of tensions. The way to peace and stability in Europe rests in particular on the use of the Alliance constructively in the interest of détente. The participation of the USSR and the USA will be necessary to achieve a settlement of the political problems in Europe.

6. From the beginning the Atlantic Alliance has been a co-operative grouping of states sharing the same ideals and with a high degree of common interest. Their cohesion and solidarity provide an element of stability within the Atlantic area.

7. As sovereign states the Allies are not obliged to subordinate their policies to collective decision. The Alliance affords an effective forum and clearing house for the exchange of information and views; thus, each of the Allies can decide his policy in the light of close knowledge of each others' problems and objectives. To this end the practice of frank and timely consultations needs to be deepened and improved. Each Ally should play its full part in promoting an improvement in relations with the Soviet Union and the countries of Eastern Europe, bearing in mind that the pursuit of détente must not be allowed to split the Alliance. The chances of success will clearly be greatest if the Allies remain on parallel courses, especially in matters of close concern to them all; their actions will thus be all the more effective.

8. No peaceful order in Europe is possible without a major effort by all concerned. The evolution of Soviet and East European policies gives ground for hope that those governments may eventually come to recognize the advantages to them of collaborating in working towards a peaceful settlement. But no final and stable settlement in Europe is possible without a solution of the German question which lies at the heart of present tensions in Europe. Any such settlement must end the unnatural barriers between Eastern and Western Europe, which are most clearly and cruelly manifested in the division of Germany.

9. Accordingly the Allies are resolved to direct their energies to this purpose by realistic measures designed to further a détente in East-West relations. The relaxation of tensions is not the final goal but is part of a long-term process to promote better relations and to foster a European settlement. The ultimate political purpose of the Alliance is to achieve a just and lasting peaceful order in Europe accompanied by appropriate security guarantees.

10. Currently, the development of contacts between the countries of Western and Eastern Europe is now mainly on a bilateral basis. Certain subjects, of course, require by their very nature, a multilateral solution.

11. The problem of German reunification and its relationship to a European settlement has normally been dealt with in exchanges between the Soviet Union and the three Western powers having special responsibilities in this field. In the preparation of such exchanges the Federal Republic of Germany has regularly joined the three Western powers in order to reach a common position. The other Allies will continue to have their views considered in timely discussions among the Allies about Western policy on this subject, without in any way impairing the special responsibilities in question.

12. The Allies will examine and review suitable policies designed to achieve a just and stable order in Europe, to overcome the division of Germany and to foster European security. This will be part of a process of active and constant preparation for the time when fruitful discussions of these complex questions may be possible bilaterally or multilaterally between Eastern and Western nations.

13. The Allies are studying disarmament and practical arms control measures, including the possibility of balanced force reductions. These studies will be intensified. Their active pursuit reflects the will of the Allies to work for an effective détente with the East.

14. The Allies will examine with particular attention the defence problems of the exposed areas e.g. the South-Eastern flank. In this respect the current situation in the Mediterranean presents special problems, bearing in mind that

the current crisis in the Middle-East falls within the responsibilities of the United Nations.

15. The North Atlantic Treaty area cannot be treated in isolation from the rest of the world. Crises and conflicts arising outside the area may impair its security either directly or by affecting the global balance. Allied countries contribute individually within the United Nations and other international organisations to the maintenance of international peace and security and to the solution of important international problems. In accordance with established usage the Allies or such of them as wish to do so will also continue to consult on such problems without commitment and as the case may demand.

16. In the light of these findings, the Ministers directed the Council in permanent session to carry out, in the years ahead, the detailed follow-up resulting from this study. This will be done either by intensifying work already in hand or by activating highly specialized studies by more systematic use of experts and officials sent from capitals.

17. Ministers found that the study by the Special Group confirmed the importance of the role which the Alliance is called upon to play during the coming years in the promotion of détente and the strengthening of peace. Since significant problems have not yet been examined in all their aspects, and other problems of no less significance which have arisen from the latest political and strategic developments have still to be examined, the Ministers have directed the Permanent Representatives to put in hand the study of these problems without delay, following such procedures as shall be deemed most appropriate by the Council in permanent session, in order to enable further reports to be subsequently submitted to the Council in Ministerial Session.

ABM and Arms Control[1]

(By Mason Willrich)

The Johnson Administration's decision to produce and deploy in the United States a "light" or "thin" anti-ballistic missile defence system (or ABM) marks a significant, perhaps decisive, turning point in the nuclear arms race and efforts to bring that race under control. How long will prevention of the further spread of nuclear weapons continue to be a viable policy objective? Will the possibility of stability in the nuclear weapons balance between the United States and the Soviet Union be swept away? What is the future role of China in the nuclear club? These are the major questions which have been brought sharply into focus.

Of major importance in the context of these issues is the fact that the ABM system the Johnson Administration has decided to deploy is, for the time being at least, limited. The United States ABM system will be limited in cost to an estimated five thousand million dollars, and limited in effectiveness to interception of a comparatively few nuclear warheads. The system being deployed will consist of two kinds of missiles and associated radar and computer systems: the longer-range *Spartan* to provide limited area defence of population centres; and the short-range *Sprint* to provide "hard point" or terminal defence for ABM radars and Minuteman silos.

The basic purpose of the ABM deployment is to provide protection to the United States against the kind of intercontinental nuclear capability which China will possess in the mid-1970s. The deployment will not protect the United States population or industry against the quality and quantity of nuclear attack which the Soviet Union is now, or will in the future be capable of launching. It will, however, provide a measure of terminal defence of United States *Minuteman* silos, and also some capability to deal with an accidental launch of a nuclear weapon delivery system.

In analysing the United States ABM deployment decision, we will first consider the salient features of the strategic nuclear context in which the decision is imbedded. Thereafter, we will turn toward an assessment of the future, focusing on three sets of complex nuclear interactions: first, the nuclear Powers and the non-nuclear Powers; second, the two nuclear super-Powers, the United States and the Soviet Union; and, third, the United States and China.

Throughout a continuing process of research, development and innovation in nuclear weapons and delivery systems since World War II, the technology of

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[1] Reprinted from International Affairs magazine.

the offense has maintained a commanding lead over the defense. This gap has not persisted because there has been no chance of intercepting an offensive nuclear warhead. Rather, the large numbers of warheads available, and the great destructive capability of each, require a degree of effectiveness for a defence that, until recently, was clearly unattainable.

From the technological imbalance of offence over defence the basic strategic principle has been derived—deterrence. In the absence of a sufficiently effective defence, it has become accepted doctrine that the largest measure of protection against nuclear attack can be found in the threat of retaliation in kind. From a strategy of deterrence the requirements for the present United States strategic posture have been developed. These requirements are summed up in former Secretary of Defense McNamara's phrase, 'assured destruction capability', which he defined as the maintenance of 'a highly reliable ability to inflict an unacceptable degree of damage upon any single aggressor, or combination of aggressors, at any time during the course of a strategic nuclear exchange—even after our absorbing a surprise first strike'.

The requirements of such an 'assured destruction capability' are survivability, reliability and penetration capability. United States nuclear forces must, first of all, be capable of surviving a Soviet first strike. Survival insurance costing thousands of millions of dollars has been purchased for bomber aircraft by airborne and strip alert procedures, and for missiles by installation underground in silos or under the sea in submarines. The benefits of survivability are twofold: the United States is placed in a strategic posture from which it will never be essential to pre-empt with a nuclear first strike rather than deter with the threat of a second strike in retaliation; and the time for decision in a crisis will be lengthened. Thereafter, we must be assured that a sufficient number of delivery systems, if launched after surviving a nuclear attack, will arrive over their assigned targets with their nuclear warheads operational. Reliability can be acquired through technological excellence, systems redundancy and large quantities.

Finally, an assured destruction capability requires the ability of United States nuclear forces to penetrate any defensive systems traversed between the place of launch and impact on target. Here the ABM problem enters the picture. The problem should be viewed from the standpoint of an offence-defence interaction. Modifications in technology and tactics on the offensive side affect, and are affected by, defensive modifications in a dynamic relationship.

There are a variety of aids for an offence in penetrating a defence. A warhead/re-entry vehicle can carry with it large numbers of decoys and chaff which will overload the defensive radar tracking system with incoming signals. Early detonation of an offensive nuclear warhead can be used to create radar blackout through which following warheads can pass undetected. An offensive nuclear warhead can be shielded so that it will be destroyed only if a defensive warhead is detonated at close range. Finally, as an alternative to penetrating an ABM system deployed around a city, offensive warheads can be detonated upwind and outside the defensive envelope in a way which will maximise fallout on the target.

On the defensive side, a variety of counter-measures are also possible. Defensive missiles can be developed with extremely rapid rates of acceleration. This will permit interception of incoming nuclear warheads at relatively low altitudes after atmospheric drag has filtered out the lighter decoys and chaff. Radar tracking systems can be deployed in configurations which will minimise potential black-out problems from detonation of either offensive or defensive warheads. Furthermore, defensive missiles can be developed with longer ranges so that avoidance of the ABM envelope will be ruled out.

Beyond these primarily qualitative aspects of the offense-defence interaction lie important quantitative dimensions. Of particular relevance is the possibility of saturation. If there are more offensive than defensive warheads associated with a particular target, then a destruction capability of that target is assured—even if the defensive system functions perfectly. Weighing the possibilities for penetrating, avoiding and overwhelming the defence against the possibilities for technical improvements in defensive systems has led most analysts to pessimistic conclusions about the cost-effectiveness of a large-scale ABM deployment against a sophisticated nuclear attack.

A basic premise which underlies the present Soviet-American nuclear balance is that deterrence consists essentially of a strategic posture—a nuclear capability in being and credible to any potential adversary. If deterrence fails, nuclear war

must be fought with existing forces. Unlike mobilisation for conventional war, mobilisation for nuclear war is a continuous process which occurs, if at all, before hostilities break out. Nuclear power politics, then, may be viewed as the evolution and interaction of a series of postures by the various participants.

Given the high stakes and large uncertainties involved, strategic nuclear planning tends to be conservative. Planning factors for developing a nuclear posture are an adversary's capabilities and the 'worst plausible case'. A potential adversary's intentions are largely ignored. When such conservative planning is applied on both sides of a conflict relationship it is easy to see how an arms race is unavoidable.

The net result to date in the evolution of the Soviet-American nuclear relationship is that each has achieved an assured destruction capability again the other. Deterrence is mutual and the level of strategic armament on both sides is very high. It is estimated that the United States could place about 4,000 nuclear warheads on Soviet targets, while the Soviet Union could hit the United States with 1,000 nuclear warheads of somewhat larger average yield. One might assume that in such a posture the two sides might declare that enough is enough. Granting the desirability of some measure of 'over-kill', each side now has it.

However, the fundamental processes of science and technology are inherently dynamic. As diminishing returns set in on the offensive side, increased attention has been devoted to the possibilities of defense. The Soviet Union has already deployed a limited ABM system around Moscow. For several years the United States has conducted an ABM research and development programme costing approximately five hundred million dollars annually.

Before proceeding further with its own ABM programme, the United States made several attempts to start discussions with the Soviet Union on limitations on further deployment of both offensive and defensive nuclear systems. In view of the failure of these attempts and the growing nuclear capability of Communist China, the United States then decided to produce and deploy a light ABM system of its own.

With this background in mind, let us turn towards the future, focusing first on the prospects for preventing the further spread of nuclear weapons in light of limited ABM deployment.

Recently, sustantial progress has been achieved in non-proliferation negotiations between the United States and the Soviet Union. At the Eighteen-Nation Disarmament Conference in Geneva the two super-Powers reached agreement on January 18, 1968 on a complete draft treaty. This will be the subject of discussion at a resumed session of the United Nations General Assembly which will convene in April after this article has been published.

Non-proliferation is an inherently discriminatory concept. It seeks to perpetuate the *status quo* of a world with five nations possessing nuclear weapons and the rest without. Certain non-nuclear nations may be reluctant to relinquish their nuclear options, especially if they believe they may require nuclear weapons in the future to offset a nuclear threat from one of the five, as with India and Japan.

What options other than nuclear weapons exist, or can be provided, for Asian nations such as India or Japan in the face of China's growing nuclear capability? If the United States has already responded to the 'modest' intercontinental nuclear force China will have by the mid-1970s with an initial five thousand million dollar ABM system, how should India or Japan respond to the medium range ballistic missile capability China will have within a year or so?

Following China's nuclear test explosions, assurances have been reiterated by high United States officials that nations without nuclear weapons can be sure that 'if they need our strong support against some threat of nuclear blackmail, then they will have it'. Will these assurances be enough in the future?

The idea that the nuclear super-Powers could guarantee the security of non-nuclear nations against nuclear attack has been suggested as a possible *quid pro quo* for signature of a non-proliferation treaty. However, such commitments by either the United States or the Soviet Union should not be undertaken lightly. Specific nuclear guarantees for non-nuclear nations would have a profound impact on existing bilateral and multilateral security arrangements of the United States. To be effective such guarantees might require nuclear force deployments which could make the cure worse than the disease. Moreover, acceptance of a nuclear guarantee from either the United States or the Soviet Union alone would largely compromise the position of any non-aligned nation, while a joint United States-Soviet guarantee would require a degree of East-West co-operation that is below

the horizon of political reality today. While some form of nuclear assurance may emanate from the United Nations, it would seem doubtful that such a dilution of responsibility on the guarantor side would be satisfying in the long run. Finally, as a practical matter, it is doubtful whether at this time the U.S. Senate would give its consent to United States ratification of a non-proliferation treaty if it included provisions which could result in a sweeping and yet uncertain extension of United States' security commitments.

In view of these considerations it is not surprising that the non-proliferation treaty draft, as it emerged from super-Power negotiations, was silent on the subject of nuclear guarantees to non-nuclear nations. Yet the problem remains, and it will have to be dealt with on a continuing basis.[1]

Will, in fact, United States ABM deployment provide, as Mr. McNamara has argued, 'an additional indication to Asians that we intend to deter China from nuclear blackmail, and thus contribute towards our goal of discouraging nuclear weapon proliferation . . .'? Or, might the construction of such a nuclear shield be interpreted in Asia as the beginning of an American shelter under which we will withdraw—a 'Fortress America' for the nuclear age?

Another suggestion for alleviating the continuing security problems of non-nuclear nations in general would be to provide them with ABM defences of their own. This suggestion does not appear to be either wise or feasible in the near future, for several reasons. The cost of even a limited ABM defence is too high—too high either for the United States to give away, or for whatever countries might be involved to be willing, and in some cases able, to pay for themselves. While cost sharing might be considered, past experience in NATO would indicate that discussion along these lines would probably produce more dissension than co-operation. In Western Europe especially, where the Chinese nuclear threat does not appear relevant in the near future, the magnitude of the Soviet offensive nuclear capability seems to foreclose any possibility of a limited ABM from achieving even marginal effectiveness.

Moreover, deploying a United States ABM system in other countries would raise a number of intractable problems of operational control and ownership. These problems would be intrinsically difficult to resolve. But also the most probable solutions would appear to be irreconcilable with existing United States legislation, as well as a non-proliferation treaty. While, therefore, the possibility of transfer of ABM systems to foreign countries should not be dismissed forever, consideration of this alternative should be postponed at least until the non-proliferation issue is resolved one way or the other.

Having examined the prospects for containment of the horizontal dimension of the nuclear arms race in light of the United States ABM decision, let us now turn to the vertical dimension and consider the future course of the nuclear relationship between the two super-Powers.

In the wake of United States deployment of a limited ABM defence the Soviets have four basic options: first, they can do nothing; second, they can offset the thin United States defence by increases in their offence; third, they can thicken their own existing defence; and fourth, they can increase both defence and offence. We may hope that the Soviets will do nothing. However, is such a response in Moscow likely? Have the Soviet leaders already made allowance in their plans for the possibility of a limited United States ABM deployment so that no further offensive or defensive increase on their side will be necessary? Such foresight would be rare indeed.

Which of the remaining three options the Soviets exercise would depend on the extent to which they share with us the assumption that an assured destruction capability is the cornerstone of national security, and whether they agree with the McNamara calculus of cost-effectiveness of increments of offence versus increments of defence. The Soviets have a tradition backed by strong emotion, if not pure logic, which emphasises defence of the homeland. Therefore, further thickening of Soviet ABM defences, either alone or in conjunction with offensive production, may not be ruled out.

Looking one step further in the interaction process, while the United States may be able to tolerate marginal extension of Soviet offensive procurement without further response, Mr. McNamara has stated that the United States would respond to Soviet thickening of its present defences with offensive increases of its own. This plan for an assymetric response may prevent a vicious upward

[1] The author discussed this problem more fully in "Guarantees to Non-Member Nations", *Foreign Affairs*, Vol. 44, No. 4, p. 683 (July, 1966).

spiral from developing on the defensive side, if it holds. Over time, such a plan is, however, likely to yield to other pressures. The overall process of research, development and innovation in the context of competing societies seems to acquire an internal dynamism and logic of its own which lead towards full exploitation of technical possibilities. New developments achieve a momentum of their own which are difficult to resist, particularly in the national security area.

With respect to offensive nuclear delivery systems, a plateau in United States procurement had been reached before the ABM decision. Present Soviet production may be viewed largely as a reaction to the large missile production runs of the United States during the mid-1960s. Therefore, ABM aside, it is possible that missile levels on both sides would have levelled off.

The deployment of limited ABM systems on both sides will exert substantial pressure to turn this flattened curve upwards again. The number of warheads which the United States can place on Soviet targets is being increased within existing levels of missiles and launchers through replacement of single with multiple warheads—the so-called Multiple Independent Re-entry Vehicles or 'MIRV's'. Therefore, some Soviet ABM deployment can be offset by the United States without resuming large scale production of delivery systems. However, if the Soviet ABM defence is thickened the outer limit of this kind of offset capability will soon be reached. Penetration will come to depend on saturation, and saturation will require resumed production of offensive delivery systems. The 'worst plausible case' here would be a gradual spiral upwards into all-out production of both offensive and defensive systems on both sides of the balance of terror. The fact that the United States could, at tremendous cost and no gain in its security, lead such a production race should counsel restraint to the Soviet Union.

However, the Soviet Fractional Orbital Bombardment System, or FOBS', is indicative of an increased tempo in the interactions occurring among the technological variables in the Soviet-American nuclear equation. To intercept an incoming FOBS, which will probably approach the United States from the South rather than the North, would require adjustments in ABM system deployment. The lower trajectory of the FOBS will place apremium on "over the horizon" radar detection systems. However, the Soviet FOBS will probably be less accurate and carry less nuclear payload due to the de-boosting requirement. Therefore, it may well be a less efficient system for delivering nuclear destruction than an equivalent number of ICBM's. In any event, if the Soviet Union does proceed to deploy Fractional Orbital Bombardment vehicles in substantial numbers it will not be the first time that the Kremlin will have violated the Pentagon's rules of cost-effectiveness.

While, therefore, the Soviet FOBS should not be traced to the United States ABM deployment, it is clear that ABM systems in general will exert strong pressures in the direction of a resumption of the Soviet-American nuclear arms race in all its aspects. If pressed further than limited deployments, ABM systems could also erase much of what little progress has been achieved in the direction of nuclear arms control. Under the Nuclear Test Ban Treaty, which prohibits nuclear test explosions in the atmosphere, outer space and underwater, it will be impossible to conduct an operational test of an ABM system. The live interception and nuclear destruction of an incoming offensive warhead with a defensive warhead is prohibited by the Treaty.

Many of the uncertainties involving nuclear aspects of the interception problem can be narrowed by simulation techniques and static nuclear tests underground. Moreover, the major uncertainties in an ABM defence are not nuclear, but rather pertain to radar and fire control systems. The margins of uncertainty in the electronic aspects of an ABM defence can be measured, and either reduced or engineered around, without nuclear testing. Nevertheless, as the scale of ABM defence increases, pressures will also increase to test the system as nearly as possible in an operational nuclear environment. While the United States will spend five thousand million dollars, would it spend 40 thousand million dollars on an ABM defence without an operational systems test?

In addition to de-stabilising the balance between Soviet and American strategic postures, the deployment of ABM systems may well reverse a major trend in nuclear strategy itself. The doctrine of 'massive retaliation', enunciated by Secretary of State Dulles, in 1954, to a large extent governed our strategic thinking until the Kennedy Administration in 1961. Then it was supplanted by the doctrine of 'controlled and flexible response' developed by the new breed of Pentagon strategist under Secretary McNamara's tutelage. Implementation

of this strategy mainly required substantial increases in conventional non-nuclear forces. But the new strategic concept also served as a basis for 'thinking about the unthinkable', for war gaming and planning a variety of possible ways of using nuclear forces short of an all-out exchange, and for terminating a 'controlled' nuclear war with something less than total destruction on both sides. The ability to implement such refinements in the practical tangle and emotional confusion of a real crisis may be questioned. Nevertheless, the doctrine of controlled and flexible response has had the virtue of inducing more rationality in thinking about strategy, and, more importantly, in planning strategic nuclear force structure.

Does the technology of ABM systems lead us inevitably back to massive retaliation at the nuclear end of the weapons spectrum? If an ABM system is credited with effectiveness, any launch of offensive nuclear missiles against defended targets will have to be sufficient in numbers to saturate the defence. Can anything short of a massive attack, whether a first or second strike, provide the required amount of certainty that the adversary's defences will be saturated? The more effective ABM systems become, the more both sides would seem to be placed in an all-or-nothing strategic deterrence posture.

It is widely recognised that the mutuality of nuclear destructive capability on both sides of the Soviet-American equation "narrows the range of Soviet aggression which our nuclear forces can effectively deter". Deployment of ABM systems will reinforce this trend. Nuclear forces will, in the context of the Soviet-American relationship, become increasingly blunt and unwieldy instruments.

We complete our appraisal of the United States ABM deployment decision by specifically relating it to the future course of the United States nuclear relationship with China.

Mr. McNamara has stated that "We possess now, and will continue to possess for as far ahead as we can foresee, an overwhelming first-strike capability against China". Without a United States ABM defence, China would also soon be capable of inflicting grave damage on the United States if its nuclear forces were launched first. As previously indicated, it is estimated that China will have medium-range ballistic missiles within a year or so, an initial intercontinental missile capability in the early 1970's, and a "moderate" intercontinenal force in the mid-1970s.

Our decision to deploy a light ABM defence has been justified primarily on the grounds of precluding the possibility of China inflicting damage on the United States in a first strike. It is difficult to imagine a rational ground for a Chinese nuclear attack on the United States in view of the immense retaliatory capability of the United States. Thus, the light ABM defence in the United States is intended mainly to constitute a shield against Chinese irrationality.

However, another and equally important argument exists in favour of deployment of a China-oriented system. Should a direct and major confrontation occur with China in the future and the United States possessed no effective defence against a Chinese first strike, the incentives operating in the United States to use its nuclear forces in a preemptive first strike would be greatly increased. The deployment of a light ABM defence may, therefore, insure not only against irrational conduct in Peking, but also that rationality will continue to govern in time of crisis in Washington.

We must, however, recognise that Peking will probably view the United States ABM defence as insurance, not against irrationality in a crisis, but against whatever Chinese nuclear forces might survive a United States first strike. Moreover, the extent to which an ABM defence would actually reduce first strike incentives for the United States against China would largely depend on the degree of confidence American decision-makers had in the effectiveness of their defence system.

In addition to direct pressure on the United States, China's expanding nuclear capability will generate increasing pressure in two other directions. First, as we have seen, China's nuclear posture and intentions are key factors conditioning the future course of nuclear proliferation in Asia. Second, China possesses substantial influence over the future course of the Soviet-American nuclear relationship. In this respect the dynamics of a technological race are working against both the Soviet Union and the United States. Improvement in relative position will be less difficult for China to achieve than for the nuclear super-Powers which are both already pressing against existing technological boundaries. Therefore, China's growing nuclear capability could be the catalyst for a major new round in the Soviet-American nuclear arms race. This would be especially true if con-

tinuing technological pressure from China's strategic nuclear posture induces the United States to thicken its own ABM defence.

What can we conclude from this appraisal of the United States limited ABM decision and of its impact on the future prospects for arms control?

First, China is moving into a position of pivotal importance. This trend is not new. But China's nuclear capability provides both the political cutting edge and an important strategic underpinning for her future role in world power politics. The United States ABM deployment will not cancel out the political power China derives from its nuclear capability. The United States ABM decision in fact recognises China as a major nuclear Power.

Second, China's nuclear power creates a range of difficult and delicate security problems for its own leadership as well as for world leaders elsewhere. Until China itself achieves a secure second-strike capability the incentives for a first strike against China in a crisis cannot be ignored in Peking, whether or not her adversaries possess an ABM defence. However, if China sets as a primary objective the achievement of an assured destruction capability against the United States, this could trigger a renewal of the nuclear arms race between the United States and the Soviet Union which would leave China even further behind. Moreover, if China does not pursue a policy of restaint in the build-up of its own nuclear forces it seems inevitable that either or both Japan and India will eventually have to respond with the acquisition of nuclear forces of their own. Such a response in Asia would, in turn, effect a net reduction in China's own security. Therefore, it will be difficult for China to use her long-term advantage the political leverage resulting from her nuclear weapons programme.

Third, the United States may well be in the most difficult position of all. Recognising China's technological power of position, how best can the United States hope to deal with it? China's leverage will be maximum if the United States continues to base its response to China on her nuclear capabilities coupled to the worst plausible case.

China will eventually achieve an assured destruction capability against the United States. Will China be more 'rational' then than at present? It is time now for the United States to face squarely the issue of an accommodation with China based not upon a first-strike capability on one side, but upon nuclear deterrence on both sides.

Article VI of the non-proliferation treaty would place an obligaiton on all parties, including the two super-Powers, 'to pursue negotiations in good faith on effective measures regarding cessation of the nuclear arms race. . . .' Present trends in the reality of nuclear weapons capabilities fly in the face of these words on paper. China will not adhere to the non-proliferation treaty. But it is too much to expect the United States and the Soviet Union to review and agree to reverse or freeze their ABM deployment decisions in light of their prospective obligations? Otherwise, how can we expect nations without nuclear weapons which adhere to the treaty to take seriously the pledge of abstinence?

The path of arms control is difficult. Yet it is the only path which leads towards what must be a paramount goal in the nuclear age—avoidance of nuclear war in a world where diverse value systems co-exist.

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Glossary of Terms for Arms Control and Disarmament

(Prepared by the Science Policy Division, Legislative Reference, Library of Congress)

Active Defense—Defense involving interception of attacking enemy aircraft or missiles by using either aircraft or missiles.

Airborne Warning and Control (AWACS)—System involving the use of large aircraft, carrying radars, computers, and communication facilities to control the engagement between interceptor aircraft and incoming adversary bombers. The system has been proposed as a replacement for the more conventional ground-based warning and control system because of the vulnerability of the latter to attack by adversary missiles.

Advanced Manned Strategic Aircraft (AMSA)—Proposed replacement for the B–52 bomber force. AMSA would be a large bomber with a capability for pene-

trating adversary defenses at low altitudes. It would carry sophisticated penetration aids. Some money has been spent on AMSA development, but even if a decision is made to go ahead with a full-scale program, the aircraft will not be available for operational purposes until about 1976. The cost of the program would probably range from $6 billion to $10 billion.

Antiballistic Missile (ABM)—A *missile* designed to intercept and destroy an attacking *warhead*, also called *anti-missile missile*. See also *ballistic missile defense*.

Area Type Defense—Defense system permitting the defense of any of a number of targets within fairly large areas. The feasibility of such defense is dependent on use of aircraft or interceptor missiles that are effective over fairly long ranges.

Arm Control—Formal or informal international action placing limitations on *armed forces*, armaments, and *military expenditures*. Includes restrictions on the use, levels, or *deployment* of weapons or forces; *disarmament*; actions to prevent the spread of weapons; and any other measures for preventing, controlling, or terminating hostilities. In a broad sense, also includes steps to produce a peaceful international environment conducive to such measures.

Assured Destruction Capability—Ability to inflict some specific level of damage on an adversary with a very high degree of confidence. This is generally equated with the ability to destroy adversary population and industry, but does not include the ability to destroy enemy military forces. For the past few years maintenance of a high level of assured destruction capability has been held to be the *sine qua non* for deterrence of thermo-nuclear war.

Ballistic Missile Defense (BMD)—Any system intended to defend against attack by *ballistic missiles*.

Ballistic Missile Early Warning System (BMEWS)—An electronic system for providing detection and early warning of attack by enemy *intercontinental ballistic missiles*.

Catalytic War—War resulting from the act of a vengeful, ambitious, or desperate smaller power provoking war between two great powers so that they will destroy each other. Such war might be brought on by the disguised machinations of a third power which contrives to persuade one (or both) of the two powers or coalitions that it is, or is about to be, under attack by the other.

CB Warfare—Chemical or biological warfare; warfare which produces casualties through the use of toxic or disease producing chemical or biological agents, or the defense against such agents. Formerly called CBR (chemical, biological, radiological) warfare, but the term *radiological warfare* is now obsolete.

Black Boxes—(1) Automatic seismic stations to detect earthquakes or underground explosions; (2) in the 1958–1961 test-ban negotiations, special depositaries where nuclear devices could be kept for use in peaceful-uses explosions or in a seismic research program; (3) unitized electronic components used in the production and use of electronic equipment.

Collective Security—A policy by an association of nations to maintain international peace through a league or confederation that would oppose by united action violations of the peace by an aggressor.

Conventional Forces—Those forces capable of conducting operations using non-nuclear weapons.

Conventional Weapons—Non-nuclear weapons. Excludes all *biological* weapons and generally excludes *chemical* weapons except existing smoke and incendiary agents and agents of the riot-control type.

Counterforce Capability—Ability to destroy the adversary's strategic offensive forces. Generally this implies a preemptive attack on the enemy's missiles and bombers before these can be launched—as opposed to an attack on industry and population. Sometimes the term is also used to describe an attack against enemy forces at any time during a nuclear exchange.

Damage-Limiting—Use of *strategic* forces to reduce the capacity of the country being attacked to inflict damage on the attacker.

Decoy—Device fired with *missile*, intended to confuse enemy defenses.

Decoy Discrimination—Ability of *antiballistic missiles* to distinguish between *decoys* and genuine *warheads*.

Deterrence—The prevention from action by fear of the consequences; deterrence is a state of mind brought about by the existence of a credible threat of unacceptable counter-action.

Escalation—The deliberate or unpremeditated increase in the scope or violence of a war; the growth of a small conflict into a broader and more violent one by successive steps.

Exchange Ratio—The number of attacking *missiles* necessary to destroy one target missiles.

Exoatmospheric Interception—Interception of adversary missiles before they reenter the earth's atmosphere.

F-12—Proposed advanced supersonic interceptor aircraft that might be used with the AWACS system.

FB-111—Bomber version of the F-111 aircraft. It was anticipated that the FB-111 would enter the operational inventory of the Strategic Air Command beginning in fiscal 1969, and that approximately 250 such aircraft would be procured. There now appears to be some question whether the Department of Defense will proceed with the FB-111 program.

FDL (Fast Deployment Logistics) (Ship)—The FDL's are designed to provide special military sealift capability for rapid deployment of U.S. forces in limited wars. The FDL's will enable the United States to deploy rapidly Army materiel should the need arise. Army materiel stored in FDL's will be maintained in a high state of readiness through environmental control and routine maintenance. The ships will have specialized handling facilities so that heavy equipment such as tanks, trucks, emergency equipment, and packaged POL (petroleum, oils, and lubricants) can be transferred rapidly ashore over the beach or at established ports wherever required.

First-Strike Capability—For delivering the first blow against the enemy's forces and destroying his retaliatory capacity before he launches a counter-attack.

Fractional Orbital Bombardment System (FOBS)—System involving the dleivery of nuclear weapons from low altitude orbital trajectories. Unlike intercontinental ballistic missiles, FOBS requires the use of reverse thrust to bring the warhead down on target. Because the apogee of the trajectory is lower than in the case of ICBM's, detection using conventional long-range radars is more difficult. For that reason, and because FOBS can be used to deliver weapons on trajectories that do not pass through the area of coverage of large warning radars, FOBS may have some attraction as a surprise attack weapon. However, the payload that can be delivered with a given propulsion system is smaller than with an ICBM, and the accuracy is generally poorer.

General and Complete Disarmament—A program to insure that states will have at their disposal only those non-nuclear armaments, forces, facilities, and establishments as are agreed to be necessary to maintain internal order and protect the personal security of citizens; and that states shall support and provide agreed manpower for a United Nations peace force.

Hardening—Protection of military facilities by making them resistant to the blast effects of a nuclear weapon. In the case of missiles, this is generally accompilshed by installing them in underground silos with protective covers.

Intervention—The interference of a country in the affairs of another country for the purpose of compelling it to do or forbear doing certain acts of maintaining or altering the actual condition of its domesic affairs irrepsective of its will.

Manned Orbiting Laboratory (MOL)—Defense project for putting two men into space for periods of up to 30 days. Intended to develop technology and equipment which will help advance manned and unmanned space flight.

Minuteman—A three-stage, solid-propellant, second-generation *intercontinental ballistic missile* equipped with a nuclear *warhead*, designed for *deployment* in a *hardened* and dispersed configuration and in a mobile mode on railroad trains. It is a simpler, smaller lighter missile than earlier intercontinental ballistic missiles and is designed for highly automated remote operation.

Missile—A self-propelling unmanned weapon.

Intercontinental Ballistic Missile (ICBM)—A *ballistic missile* with a range of over 3,000 nautical miles (JCS). It travels at a rate of 3-4 miles per second up to an altitude of several hundred miles and is propelled along its early course by its rocket engines. After the engines are cut off, the missile follows a free-flight trajectory to its target.

Missile Defense Alarm System (MIDAS)—Proposed satellite reconnaissance system to detect *ballistic-missile* launchings by infrared and other techniques. The system is not being established.

Multiple Individually Targetable Reentry Vehicle (MIRV)—System, now in development, which can carry several separate warheads on a single booster. Included is a guidance system which permits each of the warheads to be delivered against a separate target. MIRV's will be incorporated in Minuteman III and Poseidon missiles.

Multilateral Force (MLF)—Proposal made by the United States several years ago to provide NATO with a sea-based nuclear missile force. The ships were to be manned by a mixed crew from several NATO nations. The plan was strongly criticized by the Soviet Union because it feared that the scheme would give the NATO countries, especially the Federal Republic of Germany, access to nuclear weapons. The ships were never deployed and the proposal was shelved.

Neutron Bomb—A bomb which releases a burst of neutrons capable of destroying all life in the target area while producing negligible damage from heat and blast (Hadley).

Nth Country Problem—Refers to the possibility of diffusion of nuclear weapons to an indeterminate or "N" number of countries through the development of independent capabilities or the acquisition of nuclear weapons from existing nuclear powers.

Nike X—Plan for large-scale anti-ballistic missile defense deployment for the protection of the United States against a massive Soviet attack. It has been estimated that such a deployment would cost about $13 billion to $50 billion. Despite pressure to go ahead with such a program and considerable research to develop the necessary components, no decision for actual deployment has yet been made.

Nuclear Non-Proliferation Treaty (NPT)—Treaty approved by the United Nations in 1968. Each non-nuclear signatory would undertake not to acquire nuclear weapons; each nuclear power would agree not to assist non-nuclear powers in acquiring nuclear weapons. The treaty is not yet in force. While 82 nations have signed, only six have ratified the treaty as of January 1969.

Nuclear Sharing—A policy whereby a *major nuclear power* makes *nuclear weapons* available to an ally while retaining a right of *veto* over the use of the weapons.

Open-Skies proposal—A proposal by President Eisenhower at the Geneva summit conference (1955) for reciprocal aerial *inspection* of the United States and the Soviet Union and the exchange of blueprints of the military establishments of the two countries, as *safeguards* against *surprise attack*.

Overkill—Idea that the nuclear force of the United States is much larger than required for inflicting unacceptable damage on the homeland of a would-be aggressor.

Parity—The quality or state of being equal; close equivalence or resemblance; equality of rank, nature, or value; likeness (Webster). Numerical equality between Western and Communist nations in an international conference or organization.

Passive Defense—Defense of population or military facilities by protective shelter, hardening, etc.

Peaceful Coexistence—Communist doctrine that capitalist and communist states can renounce war against each other and therefore coexist peacefully in the world. The doctrine does not eliminate class struggle, ideological competition, or wars of *national liberation*.

Penetration Aids—Devices facilitating the entry of aircraft or missiles through enemy active defenses. Penetration aids for missiles include decoys which simulate warheads and the use of chaff (pieces of wire that act as dipoles) and electronic jammers to interfere with radar detection and tracking of incoming warheads. Other techniques used to facilitate penetration of ABM defenses are delivery of large numbers of warheads and decoys almost simultaneously in order to saturate radar and computer capabilities; targeting of radars rather than primary targets; and the use of nuclear explosions at high altitudes to produce ionization to interfere with radar detection and tracking.

Polaris—U.S. nuclear powered missile launching submarine carrying 16 missiles. The term is also used to refer to the missiles, of which there have been three versions. The first two, Polaris A–1 and A–2, each carried single warheads with a yield of around one megaton. Polaris A–3 carries three smaller warheads which are not individually targetable. 41 Polaris submarines have been built.

Poseidon—A successor to the Polaris submarine program involving larger missiles, each carrying MIRV's.

Preemptive Attack—First strike designed to knock out the adversary's offensive forces, population, or industry in anticipation of a possible strike by him.

Samos—A reconnaissance satellite system composed of a satellite vehicle, launch and tracking facilities, and a communications and data processing network to provide visual and electronic reconnaissance over the entire surface of the earth.

Second Strike—A blow delivered after receiving an enemy nuclear attack it may be *counterforce strike or countervalue strike* (Tempo). An attack by long-range nuclear strike forces following an enemy *first strike*. May be directed at the enemy's long-range attack force, his population centers, or other targets, depending upon the circumstances and the strength available for a *counterstrike* following an enemy attack. Most commonly, a retaliatory attack aimed at area targets (i.e., enemy population centers) with forces that may have been depleted by an enemy *surprise attack*.

Second-Strike Capability—The ability to survive an attack and launch a retaliatory blow large enough to inflict intolerable damage on the oppponent (Hadley).

Self-Fulfilling Prophecy—(1) The assertion implied in a nation's attitude of trust or distrust toward another nation, which generates, if believed, a like attitude on the part of the other, thereby reinforcing the first nation's attitude and making the implied assertion self-validating; (2) a psychological effect by which one side's defensive action may be observed by the other which, misinterpreting it as aggressive, may therefore make some defensive move. This, if misread in turn by the opposite side, confirms the original suspicions. Reactions and signals may thus be set into motion until a point of no return is reached.

Soft Facilities—Missile sites, command and control centers, or other facilities that have not been provided with protective shielding against the effects of nearby nuclear explosions.

Tallinn Defense—Defensive system deployed by the Soviet Union and referred to in the United States as the Tallinn Defense because some of the facilities were located near Tallinn, Estonia. The prevailing view in the U.S. intelligence community today is that the Tallinn system is an anti-aircraft system with no significant anti-ballistic defense capability. However, some years ago it was believed that the tallinn was primarily an ABM system, and that view may still be held in some quarters.

Terminal Defenses—Defenses designed to intercept a missile during the final part of its trajectory. Such defenses make use of the differential decelerating effect of the atmosphere to facilitate discrimination between warheads and less dense pentration aids. Because such defenses involve interception late in the trajectory of the incoming missile, they are relatively inflexible. Thus, the missiles deployed to defend one point cannot defend other points some distance away.

Weapon System—A weapon and those components required for its operation.

Yield-To-Weight Ratio—The explosion force of a *nuclear weapon* relative to its weight, or destructive power per pound of the *warhead*.

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