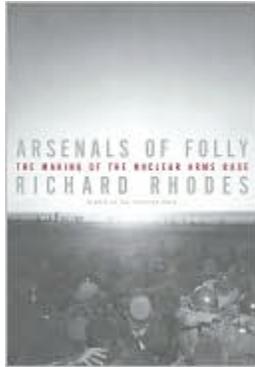




## Arsenals of Folly: The Making of the Nuclear Arms Race

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### Introduction

**JOEL ROSENTHAL:** Good morning. I'm Joel Rosenthal, President of the Carnegie Council. Welcome to our breakfast discussion with Richard Rhodes, who will be discussing his new book [Arsenals of Folly: The Making of the Nuclear Arms Race](#).

This discussion has special meaning, convening, as we do, in this venue, focusing on the ethical dimensions of international affairs. In a [lecture](#) given here 20 years ago, Father [Theodore Hesburgh](#) described the introduction of atomic and then nuclear weapons as "the greatest moral problem of all time." It's hard to argue with that view.

The capacity to destroy the planet, enhanced by the policies of mutual assured destruction, has generated an enormous body of ethical debate. Much of that debate has been joined right here in this Council. As you know, the results of those debates fill shelves, if not libraries. From the 1950s through the 1990s, we learned about escalation theories and models like the [prisoner's dilemma](#). We heard from arms-control advocates and bishops. We heard about the immorality of first strikes and massive retaliation. Yet we also heard arguments of the necessity of such policies.

As a boy in the 1970s who became a student of these issues in the 1980s, I found myself asking a basic question: How did we get here? How did it come to this? Just as I asked those questions, I had the great good fortune to read Richard Rhodes' book, [The Making of the Atomic Bomb](#), which appeared in 1986. I will never forget reading it.

The book told the story with all of the human elements and the dramatic uncertainty it deserved. It explained the how of the science and the why of the policy decisions. I was very grateful to Richard Rhodes for writing the book, and so today, belatedly, I have the opportunity to thank him and also to thank him for writing the subsequent book, [Dark Sun](#), which explained the making of the hydrogen bomb, and as well, for the third book in the trilogy, which he will discuss with us today.

As a reading of the book will remind you, the issues that were so urgent in the [Cold War](#) are far from dead. Questions abound about proliferation, threat perception, and the expansion of an arms race. Whether it is the placement of interceptor missiles in Poland or the expansion of offensive weapons into outer space, momentous decisions are being made, billions of dollars being spent. It seems prudent, if not outright necessary, to take this moment to ponder what we have learned from recent history.

Fortunately, we have the best possible teacher available to us this morning to take us through these issues. Richard Rhodes is one of the most distinguished journalists of our time. The winner of the Pulitzer Prize and the National Book Award, among many other prizes and fellowships, Richard Rhodes is not only a nuclear historian, but also a great observer and chronicler of American society and culture. His writing includes [Why They Kill](#), an investigation into the roots of personal violence; [A Hole in the World](#), a personal memoir; [John James Audubon](#), a biography; and four novels.

To give you just some sense of the sheer beauty of his writing, I will leave you with a single but telling image offered by a critic reviewing his Audubon book. The critic wrote, "Rhodes does for Audubon what Audubon does for birds."

Please join me in giving a very warm welcome to Richard Rhodes.

## Remarks

**RICHARD RHODES:** Unlike Audubon, I didn't shoot those birds or Audubon.

I want to be sure that I finish on time. I know you have schedules to keep. But I would like to try to cover quite a bit of ground. Normally I talk only about what is in this book, but I think for you today I should also talk about some more recent developments that I think you will find very interesting.

I really wrote this book to try to answer that question: Why did we build so many nuclear weapons? Did we really need them all? I had understood early on that it only takes a few. You may not realize that China today only has 20 intercontinental ballistic missiles aimed at wherever they are aimed at. I spoke with a Chinese graduate student at Harvard two days ago and asked him, and he said, "Yes, that's our deterrent. We figure half of them won't make it, but 10 are plenty." And he's right; 10 are plenty. Two are plenty.

I asked [Robert McNamara](#) why, if the United States was so far ahead in terms of numbers of ballistic missiles during the [Cuban missile crisis](#)—when we had several hundred and the Soviet Union had four—we weren't more aggressive in pursuing the Soviet Union than we were. We were aggressive enough, but we wisely held off from, let's say, invading Cuba. McNamara said, "Neither the president nor I would have countenanced any political decision that would lead to even one bomb on one city in the United States," which echoed something I had found in the writings in *Foreign Affairs* of [McGeorge Bundy](#) in 1969, after he retired as national security adviser to two presidents. He wrote—and this is almost verbatim—"A political decision that would lead to one bomb striking one city of one's own country would be recognized in advance as a catastrophic blunder. Ten bombs on 10 cities would be a disaster beyond history, and 100 bombs on 100 cities is unthinkable."

So the numbers that made sense to the political leadership, on our side and certainly also on the Soviet side—I found statements by every Soviet leader after [Stalin](#) to exactly the same effect.

[Khrushchev](#), for example, said, "When they first told me what we had and what it could do, I couldn't sleep for three nights in a row. Then I thought, 'Well, I'll never use them,' and after that I could sleep."

So the other side understood this as well. Therefore, again, you ask the question, why so many? Of course, there was all sorts of strategy that was devised. You are familiar with all of the theories of deterrence and so forth. But underneath it all, I think, was a fundamental category mistake and was also a fundamental and deep existential fear that somehow, if you didn't have more than the other side, you would be deeply vulnerable, even though, at some level, everyone at the highest levels of government understood that you only needed a few, like the Chinese deterrent today.

The category mistake—and I found this in several different places in the early years of the development of our nuclear arsenal—was, failing any real way to use nuclear weapons, to conclude that they could

somehow be treated in much the same way as conventional weapons. For example, [Paul Nitze](#), one of our leading arms-control experts for many years, was one of the people involved in producing the [Strategic Bombing Survey](#) of the Second World War, the extended study—the careful study—of the effects of strategic bombing both in Europe and in Japan. Most of you, I'm sure, are aware that we firebombed Japanese cities prior to the atomic bombings, such that all cities with more than 50,000 in population were substantially burned out, with a total death rate of almost 1 million civilians, even though we never actually invaded the country.

Nitze went to Japan after having worked in Germany, and visited Hiroshima and Nagasaki after having seen, for example, burned-out Tokyo, where in one night, the first night of our strategic bombing campaign, we burned out 18 square miles of downtown Tokyo and killed at least 140,000 people and seriously injured perhaps half a million. He looked at Hiroshima and Nagasaki, he looked at Tokyo and other cities like that, and concluded that atomic bombs really weren't more destructive than the equivalent firebombing process.

I should say that nuclear weapons are preeminently weapons of mass fire, not a blast. They start fires simultaneously over a large area, which typically can coalesce into a kind of tornado of fire, with winds coming in at the outside of the tornado of up to 500, 600 miles an hour.

So Nitze concluded from looking at this first use of nuclear weapons—and, thank God, the only use of nuclear weapons—that these were not going to be decisive weapons, that you could fight a war with nuclear weapons and it wouldn't look any different from the way Japan looked with firebombing. That was his conclusion.

But, of course, he wasn't, perhaps, thinking through, first, that these were very small weapons by modern standards, what we today would call tactical nuclear weapons. Our typical weapons are above 80 kilotons. The Hiroshima bomb was 15; the Nagasaki bomb was 22. So these were relatively small weapons. And I think he evidently didn't consider the fact that it was one plane that delivered one bomb, and that if you had 1,000 planes delivering 1,000 bombs, it would be orders and orders of magnitude more destructive than simply firebombing.

From that he took a career-long belief that nuclear weapons weren't quite what people thought they were and that, therefore, it was useful to have as many as possible. He liked to say that to have dominance at the highest level of violence gives you advantage at every lower level, in terms of negotiations, which may well be true.

Out of that and out of a great fear of a possible Soviet invasion of Europe—and let me interrupt that sentence to say that the issue at the beginning of the Cold War, for [Dean Acheson](#), for Paul Nitze, for those who were developing nuclear policy in the late 1940s and early 1950s, was that two world wars had started in Europe and that somehow Europe had to be brought under some kind of surveillance and control, from the American point of view, such that another war wouldn't start there. At the outset, with the Soviet Union having 4 to 5 million men on the ground in Eastern Europe and the United States having basically brought its troops home, we saw the differential as our nuclear capabilities versus Soviet conventional capabilities.

When the Soviet Union got its bomb, in 1949, then, everything changed. The great concern was, how do we hold Europe? It was as much a concern for whether Germany might rearm under these circumstances as it was about the Soviet Union directly. In fact, the whole European question threads its way underneath the entire decades of the Cold War, as the real and fundamental question of the Cold War, far more so than the ideological differences between the two sides. Thus, at the other end of this story, when the Soviet Union, under [Mikhail Gorbachev](#), and [George H.W. Bush](#) agreed to a [Conventional Forces Treaty in Europe](#) in 1989, which gave the [Warsaw Pact](#) and [NATO](#) equivalent numbers of tanks and armored vehicles and artillery and so forth, that marks the real end of the Cold War. At that point, there was no possibility of the Warsaw Pact dominating Europe anymore, because our equipment was better than theirs and our training was better than theirs. So we finally felt secure.

That's one of the reasons, the category mistake of treating nuclear weapons as if they were conventional weapons somehow, as if you actually could fight a war, when every side understood that you couldn't.

In fact, that is really, I think, the great paradox. If leaders didn't believe they would ever use these things, why did they allow so many to be built? Once you are in that situation, you decide, evidently, that it's not going to happen on your watch. Therefore, all the various possible political uses, domestic and international, of nuclear weapons come to the fore. It's as if everyone chose conveniently to forget the really horrible and deep destructiveness that was implied by this arsenal.

For example, the [Single Integrated Operating Plan](#), the SIOP, for the mid-1950s under [Curtis LeMay](#) and the [Strategic Air Command](#) envisioned flying everything in the arsenal simultaneously into the Soviet Union from all directions and bombing as you go to open the way against possible antiaircraft assault and so forth. That is to say, we were going to bomb our way through Eastern Europe, through Poland and Hungary and Czechoslovakia, and then bomb the Soviet Union, and then continue on and bomb China, whether or not they were actually participating in whatever conflict it was.

There was at one point a Navy officer who said to the SAC leaders, "Would we bomb China, even if it weren't involved? Shouldn't we have a plan that somehow allows for the possibility of excluding China?" General Tommy Power, who was LeMay's second-in-command, said, "Yes, we could do that, but it would screw up the plan."

The numbers of people who would have been killed in such an assault defies imagination—285 million people, by official estimates. But the official targeting plan, another category mistake, only calculated the effects of blast and not of fire. If you look at the total effect of a nuclear weapon exploding over a city or anywhere else, the real estimate would have been closer to 1 billion to 2 billion people.

I ask you again, thinking of McNamara's comment, what political decision could possibly justify killing that many people? Where would democracy have been as an ideal had such a thing happened? Of course, we would not have survived either. The effects of nuclear winter, which were only identified and articulated in the later 1980s, would certainly have come back upon us and affected us as well.

Into this folly—and I called it that in the title of my book because I couldn't think of a better word for this desperate and, I must say, of course, in most cases, well-meant—these were people trying to deal with an impossible problem. You can't fight wars with nuclear weapons. They are too destructive. If even one comes through whatever screens and shields you build, you have a politically impossible result.

Under those circumstances, when people were asked to figure out a way to incorporate these weapons into the system, they did the best they could and, with a few exceptions, with the best of intentions. But it involved not thinking about all of these terrible destructive aspects of these weapons, in order to make it possible to think about using them in any way.

So there was this total disjunct between the political leadership, on the one hand, and the military, which had the job of figuring out how to deal with all this, on the other.

We came to the point, by 1985—a very dangerous time in the Cold War, a period that has been called "the second Cold War," from the time President [Reagan](#) came into office until the end of the Soviet Union, or somewhat before that—we came to the point where there were, between us, somewhere between 50,000 and 70,000 strategic nuclear weapons bristling on "launch-on-warning," meaning 10 to 15 minutes of warning time.

A quick story. [Zbig Brzezinski](#), [Jimmy Carter's](#) national security adviser, tells the story, around 1977, of receiving a call in the middle of the night, when he was in his bed in Washington with his wife asleep beside him, from [NORAD](#) [North American Aerospace Defense Command] saying, "Zbig, we just got signals on our radar that there are 200 incoming Soviet warheads on the way."

Zbig's response was to say, "Check it out and call me back. We have a total of eight minutes to get all this figured out. I'll have to call the president in five minutes to give him the two minutes that are allowed in the plan to make up his mind whether to retaliate or not."

The officer set down the phone. A minute goes by. He calls again. "Zbig, it wasn't 200 warheads. It was 2,000 warheads."

"Check again. Be sure. I'm almost ready to call the president." He is ready to do that. He is sitting there thinking, "We're going to be gone in less than 30 minutes here."

The phone rings again. The officer says, with great relief in his voice, "It was a practice tape someone put in the computer at the wrong time and place. There's nothing coming through."

Zbig said, as he told this story, "I didn't even bother to wake my wife. There was no point. We all would have been dead in under 30 minutes anyway."

That sort of thing happened more than we would be comfortable knowing. I describe something called [Able Archer](#), which was an exercise of the NATO forces in November of 1983 that very nearly came to lead [Yuri Andropov](#) to believe that we were starting a nuclear war and that he should preempt before we did so. Again, it was a very close call—some people have said to me, as close as the Cuban missile crisis.

I have asked people who were CIA people or intelligence people if there more things like that during the Cold War, and the answer was, "Oh, yes, more than you realize."

So we will be hearing about these things.

Into this world stepped two people, Mikhail Gorbachev and Ronald Reagan, with a very different sensibility than the people who worked for them, if you will; both of them outsiders, both of them small-town or farm boys, really, who grew up away from the centers of power in Moscow and Washington, not city slickers, if you will—provincials, in a way. They came to their positions with a different set of attitudes and conclusions than were the given wisdom in their capitals and in their governments.

Gorbachev was born on a farm in the Ukraine in 1931, at the time when Stalin was installing his terror famine to force the peasants, the farmers, to go onto the collective farms. Some members of his own family starved to death during that time. One of his grandfathers was arrested as an enemy of the people, a kulak, and went through some torture and a year in the gulag before he managed to get free.

Gorbachev grew up farming with his father and running a combine. He made it to college. He won a four-year scholarship to the Moscow University by combining more grain in the summer of his 17th year than any other young person in the entire Soviet Union—880 tons of grain. That won him a medal and a scholarship. He studied law at Moscow University. He met [his wife] Raisa there. She had a similar background. Her father had been "gulaged" for a while. Her grandfather had been shot.

Although they both grew up dedicated to the ideal of communism, they also both grew up with a keen sense that it, as an ideal, had not fulfilled itself, that it was, in some sense, corrupted.

Later on, at the end of his era, Gorbachev had finally thought his way through to perceiving his country as potentially a socialist democracy like many countries in Europe. But for the beginning of his era, he really wanted to try to reform what he saw as a workable system, whether it was or not, because he felt that it had become profoundly corrupt.

He learned that, of course, the hard way. He went through the apparatchik system as a party leader, first in Stavropol in the Caucasus, and was eventually brought to Moscow as a protégé of Yuri Andropov.

But his specialty was agriculture. He was the minister of agriculture until he became general secretary.

His concern was that the rural part of the Soviet Union, which he knew well, had been neglected, economically and otherwise, throughout the entire history of the country, that only 10 percent of the national resources were going to that part of the country that produced a much higher percentage of its goods—and, indeed, it couldn't feed itself. He entered office with the puzzle in his mind and the question of what caused that: Why should a country so rich in resources not be able to feed itself?

He discovered very quickly that the defense budget had never once been questioned in the entire history of the Soviet Union. The military-industrial complex brought in its budget, the Soviet premier or general secretary rubber-stamped it, and off it went, cranking out whatever it was cranking out—tanks, nuclear weapons, missiles, and so forth. He decided that the only way the country could ever get a handle on its domestic problems was to get the defense budget down.

How do you do that? You have to rethink the whole basis for the defense budget: Was the United States actually going to attack the Soviet Union?

By then he had traveled in Europe. He had lived in Italy for a few months. He had been in Canada and toured extensively its rich agricultural complexes. He had concluded that there was no way on earth countries as rich as the United States or France or Great Britain or the other countries of Europe would think of starting a war with the Soviet Union. Why would they want to lose so much, all that they had?

On that basis, he was able to begin, and he did begin, telling the defense people, when they came in with a new weapons system, "Comrade, are you planning to start a war with the United States? Because I'm not. Get out of my office."

He was ready, then, when Reagan was ready, as a result of experiences like the Able Archer episode in 1983, as well as Reagan's longstanding belief that nuclear war was the one thing that could destroy this country that he loved, that the United States was basically invulnerable to anything else, but not to nuclear war, and that therefore the answer was to get rid of all nuclear weapons in the world.

So these two men came together at Reykjavik, in particular, with that vision in mind.

What happened there I won't go into now. You can read a very detailed description of the [Reykjavik Summit](#) in the book. The chapter is about 60 pages long. I had access to both the Soviet and the American notes that were kept by the diplomats on each side, to reconstruct this extraordinary dialogue between these two people.

Just to give you one small sample that always sends a chill up my spine: Reagan at one point, to try to convince Gorbachev that they should both agree on nuclear elimination—but in Reagan's case, provided he got to continue working on his [Strategic Defense Initiative](#) [SDI], which Gorbachev was not prepared to allow. In any case, Reagan, in trying to convince Gorbachev, said, "You know, if we do this, 10 years from now we could come back here, each of us bringing the last two missiles in our arsenals. I would be so old, you wouldn't recognize me. You'd say, 'Ron, is that you?' And I'd say, 'Mikhail?' Then we would destroy the last two missiles in the world, and the whole world would have a tremendous party."

That's how close they came. The sticking point was that Reagan was not prepared to give up what he felt was his original contribution to the problem of how you eliminate nuclear weapons, which was that you must have some kind of shield over your country. The fact that that was technologically, and indeed physically, impossible, that warheads always get through and it only takes one or two—he simply felt that somehow American science and technology could solve those problems, even though, in fact, they are insoluble.

He was almost prepared to be willing to limit SDI to the laboratory for 10 years, which was Gorbachev's

request, Gorbachev's counterproposal. Gorbachev was prepared to give up everything in the way of nuclear things that the Soviet Union had, so long as for 10 years SDI would be confined to the laboratory.

The adviser who helped Reagan stick to his mistaken belief in SDI was [Richard Perle](#). I asked personally, when I was working on the book, did this, in fact, happen? The story is that the president went around the room, and all the other advisers said, "Look, we can settle the 10-year thing in Geneva down the road. Go ahead and accept the deal. It's a great deal." When he got to Perle, Perle said, "Mr. President, it will destroy SDI."—not that Perle believed in SDI. He saw SDI as a way of preventing arms-control negotiations. At that point, Reagan heard what he wanted to hear from this particular adviser and decided that he couldn't agree to Gorbachev's terms. Reykjavik ended in what seemed, at that moment, failure.

But, in fact, by the time Gorbachev had left the meeting house and arrived at the hall where the journalists were waiting to hear about this extraordinary event—1,000 journalists from all over the world—Gorbachev, in his mind, had turned it all around and realized that this wasn't a failure, it wasn't an end; it was a beginning. They had put all these things on the table for the first time. As you know from negotiating, once it's on the table, you can't take it off again. You have to reckon with it. It was indeed the beginning.

The Bush administration came in. It was somewhat cautious for a while. But by the end of the Soviet Union, major, major reductions had been made, and more were made later.

We still have far too many weapons, something like 10,000 and 15,000 strategic warheads between the two sides—far more than either side needs.

Just to finish up with that and get to the present, I just came last week from the second meeting of [George Shultz's](#) group that he has formed with [Henry Kissinger](#), former secretary of defense [Bill Perry](#), and [Sam Nunn](#), to, in the tradition of Reykjavik, 21 years later, begin the process of proposing that the world work on a treaty eliminating all nuclear weapons. This is an extraordinary and historic change. The people who were for nuclear elimination up to now have basically been private citizens, people marching in the streets. For the first time, a large group of primarily Republican, primarily Reagan-era alumni of high government positions have announced themselves completely in favor of the total elimination of all nuclear weapons.

Last year, on the 20th anniversary of Reykjavik, they proposed in a [Wall Street Journal editorial](#)—I'm sure many of you saw it—a 12- or 13-step program for how you do that. This year they commissioned expert papers on the actual practical process of how you do that. It's a very complicated business, needless to say.

The papers will be published in book form by the end of the year, by the way, and the debate that I observed and participated in with Henry Kissinger and all the other members of this group, including Richard Perle, who voted against it last year. I think he wants to watch what's going on so he doesn't miss anything. Next year they hope to have an international conference and bring other countries in as well.

So 21 years later, Reykjavik is still bearing fruit, as the beginning of a process that must inevitably follow. I have argued in the first book on this subject that I wrote, having read [Oppenheimer](#) and [Niels Bohr](#) and some of the scientists who had thought through the whole question of nuclear weapons carefully and well—I wrote that the only answer ultimately is to eliminate all nuclear weapons, which doesn't put you in a vulnerable position as long as you maintain the capability of building them.

Deterrence, if it works at all, doesn't depend on how quickly you deliver the weapons; it depends on the certainty with which you could deliver the weapons. That means that the whole world could slowly move back, as Sam Nunn likes to describe it—"delayed deterrence," he calls it—to the point where it takes a year for anyone to develop a nuclear weapon. Thus, if one side began to do that clandestinely, if you had

a sufficiently transparent system in the world with everybody watching everybody else in this field, then your response ultimately, if it had to be—if diplomacy didn't work, if mass conventional war from all the other countries in the world didn't work—you could always begin to build nuclear weapons again yourself. At worst, you would end up with the world we have today again, when we are at launch-on-warning and the president has two minutes.

So what these people are working on is radical and necessary. I must say, the real impetus, I think, for their interest has been 9/11. The real message that governments took from the terrorist attack of 9/11 was, "My God, what if those guys had been carrying a nuclear weapon"—the possibility, that is, that, now or in the future, a subnational entity such as a terrorist group could either steal or build at home a nuclear weapon and use it to take out one or more cities.

There was, in fact, a high expert study done at [Livermore](#) last year asking, if so, where and when? The Livermore group's answer was, within the next 10 years, and Moscow. But Moscow or New York or any other major city in the world, the economic consequences alone would, of course, be catastrophic. The consequences for civil liberties would be even more catastrophic.

I think that is the deeper impetus for the Shultz group's decision to move on something that they weren't prepared to move on back during the Reykjavik days. I think it's immensely hopeful. When the time comes, as I'm sure it will, when they reach out to all the communities of interested individuals in this country and elsewhere, I hope you will want to take part in it.

It will form about the last third of my next and final volume, because I have understood all along that I needed to deal seriously with the question of abolition. The delight for me, as a writer, is that here I have in real time a real group of people actually trying to think all that through and work all that through—and substantial people, too.

So I have been following the group in great detail and interviewing individuals as the whole thing goes along. I will tell that story in the next book.

There is much more in the book, of course. I hope you will take a look at it at some point. I'm sure you will find it interesting. But that is the connection for me between those events and current events.

## Questions and Answers

**QUESTION:** Thank you, sir, for a wonderfully revealing discussion of a very important subject. I am just a private citizen who has developed an interest, in semiretirement, in the whole business of how the Cold War began. I want to ask you, do you think Iran will be invited to that meeting that you think will happen? Will North Korea be invited to that meeting?

**RICHARD RHODES:** George Shultz is a very cautious man. Whether they will be invited the first time around I don't know. But there is no way that we can get to zero without including countries like North Korea, which is already a nuclear power, and countries like Iran which are moving in that direction.

How do we do that? The fundamental realization that Gorbachev came to was that the only way you can be secure in the world is when your enemies are secure. You have to satisfy their security needs in order to satisfy your own security needs. That idea of common security was what Gorbachev brought to the table at Reykjavik. It is fundamental to the whole process of eliminating nuclear weapons. It is a very, very complicated issue. It means that things like the Israeli-Palestine issue will have to be resolved. Indeed, I daresay Israel will be the last country that finally commits to this process somewhere along the way.

But there is no way to get to zero except to include every nascent nuclear power. Any country that has a nuclear power apparatus, that has a nuclear power infrastructure, is already 90 percent of the way to

being a nuclear power. So the whole world will be involved. There are at least 34 countries today that could be nuclear powers within a year or two. They have the infrastructure. They have the plutonium in their commercial power reactors. It's simply a matter of putting it all together.

So the whole world will be involved in this. In a way, it's going to be the final resolution of the issues that were left hanging at the end of the Second World War and then frozen in place all during the years of the Cold War.

It's going to be a very exciting time. I think you should see it with some optimism, too. I think everyone is interested in eliminating nuclear weapons.

**QUESTION:** Thank you for the depth of your analysis. But there is a follow-up issue. That is, until now you have been talking about countries that have nuclear weapons. What about rogue groups, most obviously al-Qaeda, where there is no territory to retaliate against them? What do you do? How can you destroy all nuclear weapons when there is a danger that somebody out of nowhere could attack?

**RICHARD RHODES:** It was, in fact, the "undeterrability," the theoretical "undeterrability," of a subnational group with no assets to protect—or, as they say in the business, no home address—that led to, I think, the Shultz group's great concern, and certainly Sam Nunn's great concern.

The immediate and technological answer is, you have to get control of all the fissile material in the world. That isn't quite as hard as it sounds. It's not as if it's just lying around, not even in the Soviet Union. Everyone who has material capable of making nuclear weapons understands that you have to keep watch over it. The level of control in the Soviet Union was perhaps different from ours and not quite so tight, but there was a system, and as long as the country had fences all the way around it—it was a sort of prison camp—it worked very well.

The problem was that when the borders opened up, the Soviet Union was facing the kind of situation that we have faced all through our history, since we are a country with more or less open borders. That's where the great investment of the [Nunn-Lugar program](#) has come in.

The fact is, at this point in time, terrorist groups cannot make fissile material. It takes a huge infrastructure to do that, as we have seen with Iran's very slow development in that direction. Three thousand centrifuges is a lot of centrifuges. It's very high technology. It's hard to make happen and it's hard to keep running.

So in that sense, if you can gain control of all the material through an international program of accounting for the material—systems that we do have in this country of real-time materials accounting and control—then you are in a position to say that a terrorist group isn't going to be able to do it.

However, the problem you raise, which is the possible rogue group clandestinely putting together a few weapons, is similar to the problem of the last few steps before you go to zero. That is to say, when every country is down to five weapons, how do you get to zero from there? That hasn't been answered in the programs that the Shultz group is working on, except in a general sense. That is, one way you could do that would be to have a small cache of nuclear weapons under international control, physically taken apart and the parts kept in various places, as a way of making sure that nobody steals one. That would serve as the deterrent.

However, in the longer run, as I said, it's not as if we will forget how to make nuclear weapons. If someone turns up with a nuclear weapon, every other country in the world would do everything in its power to get that weapon out of that group's hands. At that point, if that didn't work, it's possible, then, for countries to go back to building them themselves. You wouldn't want that outcome, but that's potentially the final shield and protection of this system.

It is obviously a difficult problem, and it is, I think, going to be at the center of the issue.

**QUESTION:** Assuming that Iran is invited to join this group and they, number one, say they won't stop their nuclear program or, number two—more likely—say, "We never had any intentions of building an atomic bomb, but we intend to continue our nuclear program," what do you do to ensure the fact that they never can get a nuclear bomb? Even though we know they have cheated in the past, how can we make sure they don't cheat in the future?

**RICHARD RHODES:** Again, the only way that the world is going to go to zero is by opening up, developing a much higher level of transparency. I don't mean you can solve the problem with inspections. You can't. You can inspect and inspect and inspect, but we are talking about an amount of plutonium about the size of that glass. That is not very much, and it's very easy to hide.

But you are thinking in terms of the present system. If we are going to include Iran in the process—which we must or it's not going to work—we have to take cognizance of Iran's security needs. They are building nuclear weapons probably for two reasons, as many countries have. One, and fundamentally, they believe it's necessary to their national security. Second, they feel, because the great powers have had nuclear weapons in their arsenals for all these years, that the ownership of nuclear weapons gives you prestige, gives you a place at the table.

We have to address those questions, "we" meaning the world, not just the United States, and not only for Iran, but for North Korea, for Syria, for every other country that is potentially thinking of going nuclear—for India, for Pakistan.

I asked the general who runs the Pakistani nuclear program, at a briefing recently, what it would take for Pakistan to give up its nuclear arsenal. He didn't have to think for a second. He said, "If India gave up theirs."

That is exactly the kind of trade that is going to have to happen. It sounds, I think, utopian. But these are not issues different from the issues we face every day as a country and as a world. They are the very same security questions. But we are locked into a system where our solution has fundamentally been militaristic rather than diplomatic, and I think we have to move beyond that, clearly.

That, after all, is what led Reagan to have success with his negotiations, when he stopped simply building up the defense establishment with a \$1 trillion increase in the budget over five years and turned to the easier but harder problem of personal diplomacy.

So the plan that the Shultz group had put together was that the president—or a United States president, if this president wasn't interested—would go to the United Nations and say, "We're prepared to give up our nuclear weapons if the rest of you will come along. Let's get busy working on a treaty."

I must say, the idea was that President Bush could do this in the last month of his administration and save it for history. The Iraq War would be a footnote if he stepped forward and made this proposal.

He has been briefed. [Condi Rice](#) has been briefed on this by the Shultz group. So has [Dick Cheney](#). Silence coming from there.

As [Max Kampelman](#), the ambassador who made this proposal originally, said to me, "Well, I'll just have to wait for the next president." Indeed, [Barack Obama](#) has already signed on to the Shultz group's project, and I'm sure others will follow.

**QUESTION:** It is reassuring to hear about the Shultz group. This question has to do with the sense of public urgency. We all grew up—most of us in this room—when the bomb, in the 1950s, was a defining presence in our lives. But now it seems that the sense of public urgency has diminished.

I wonder if you could comment on the irony that now the alarm bells are ringing for the next great

menace, which is global warming, which is way down the pike in many ways, versus the nuclear threat, which could come from absconding with even one of those many nuclear weapons in lightly guarded arsenals, and that could happen immediately.

**RICHARD RHODES:** Absolutely, tomorrow, today.

It is interesting that as soon as the Cold War was over, nuclear weapons fell off the table. Several weeks ago, I interviewed the gentleman who was head of the National Nuclear Security Administration. He said, "You know, there was no policy coming from the White House, neither from President Bush nor from Vice President Cheney. I waited a long time and then decided somebody had to have a nuclear policy. So I started generating it."

That, I think, is another example of what you are talking about. It simply has not seemed a consuming and present issue—until really thinking through at a level of national government the possibilities implicit in 9/11. That has begun to make a dent, at least in this group of former leaders.

It may come to nothing. Sam Nunn suggests that the odds are 50/50 that a nuclear weapon will go off in the United States in the next 10 years. Bill Perry, the former secretary of defense, makes a similar prediction—in fact, he says it's certain, which I think is a little bit higher percentage than perhaps it deserves.

But the fact is, I tell you candidly, anyone who can put their hands on 25 kilograms of highly enriched uranium can make a bomb with their bare hands. I said that to a bomb designer recently at [Sandia](#) [National Laboratories], and he said, "And if you can accelerate the two pieces even a little, you get a lot bigger explosion." That's why highly enriched uranium is a much more important material to bring under control than plutonium, for which it is very difficult to design a system to make it explode.

**QUESTION:** May I ask you, why do you think the American government right now is putting so much pressure on the Indian government for a bilateral nuclear deal? Is it against the [NPT](#) [Nuclear Non-Proliferation Treaty] or is it not?

**RICHARD RHODES:** Yes, it is. Fundamentally it is. India is outside the NPT. It never signed the NPT. Therefore, strictly speaking, to give benefits of peaceful nuclear technology, which is what we are talking about, to a country that is not a signatory is to violate the spirit of the NPT. The whole idea was that countries would not go nuclear in exchange for peaceful nuclear technology from the nuclear powers.

Of course, we haven't kept our end of that bargain either, because we haven't moved toward eliminating nuclear weapons.

I talked to [Philip Zelikow](#), who used to be in the State Department under Condi Rice and who was the man who worked out the Indian deal, and asked him what he had in mind. He said, "They have been a nuclear power since 1974." (The NPT officially became effective, I think, in 1970-71.) "To leave them out of the system is to leave them in a rogue state that really makes it impossible to help them limit their program. Therefore, we thought they should simply be grandfathered in."

So that was the point of view of the Condi Rice State Department. That, of course, begs all sorts of questions.

India is an ally. Perhaps this was the only way this administration that really doesn't believe in treaties could see to get at the problem of India being outside the NPT.

But it has certainly had its ripple effects. As I said, there are 34 countries that could go nuclear in a very short time. They haven't, primarily because of the agreements of the NPT. For us to play with that is really to play with fire.

But I do believe—and I just say this honestly—this is an administration that seems to take pleasure in eliminating treaties that it believes are ineffective or dangerous or whatever. The [Anti-Ballistic Missile Treaty](#) that was abrogated early in the Bush administration is a great example. That was an absolutely central treaty to the NPT. Now it's gone.

So that is an unresolved issue. But as it turns out, India is evidently not going to go along with the deal, for domestic political reasons, right now at least.

**QUESTION:** I would like to go from the present to the past and the history. You called them "arsenals of folly."

**RICHARD RHODES:** Yes.

**QUESTIONER:** But let's go back to the development of nuclear weapons. The Germans were working on this—

**RICHARD RHODES:** Not very much, but they were.

**QUESTIONER:** Subsequent to the split between Russia and Germany after the Germans attacked the Russians, many of the scientists came over to this country. There was a war against fascism. It had to be destroyed completely. It became a total war, with total destruction, whether it was the firebombing of Germany or, in fact, the development of a nuclear weapon. It was not the right wing of those days that developed those. The right wing was basically isolationist.

**RICHARD RHODES:** Yes.

**QUESTIONER:** So the Democrats, under [Roosevelt](#) and later under [Truman](#), were the ones who used it. They authorized it and they used it. But it was to save American and Western lives, to thoroughly destroy those cities, particularly in Japan. Otherwise, it would have required so many other troops

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You raise the question of Curtis LeMay and the Strategic Air Command and the strategy at that time. Again, it was because there was competition to develop them. We didn't know that the Soviets had so few bombs. Even when [Kennedy](#) was elected president, it was on his campaign that the Americans were falling behind the Russians.

**RICHARD RHODES:** Actually not, but that's what he said.

**QUESTIONER:** Only subsequently did we find out. But the Russians did try to put missiles in Cuba. That was still weapons.

My question now is, when you deal with Gorbachev and the wisdom of his ways, there was also the Reagan policy of going after the Soviet economy. There was the development of lasers subsequent to the nuclear weaponry. But the Russians were working on that. We upset the Soviet economy.

I am sure you have dealt with this in your own book and the previous one. But at the same time, when you say "arsenals of folly," was there not a development of weaponry in order to meet what were perceived as threats? At that time, and also in the 1950s, there was no Sino-Soviet split that was largely discussed, even by academics—very few. They said, why attack China? The answer was because China was seen to be an ally of the Soviet Union.

**RICHARD RHODES:** I understand what it seemed to be. But even military people in our own government understood that China wouldn't necessarily be participating in whatever conflict was involved. The plan was an overall, all-encompassing plan, and Strategic Air Command was not interested in qualifying it or simplifying it.

Absolutely, why we built the bomb, and the reasons we used the bomb are all tied up with the question of mass strategic bombing. Whether we needed to or not is another question, not to go into here. The fact is, we did. The invasion didn't happen. Lots of lives were saved. Some lives were lost as well.

But I don't agree with your depiction of the early Cold War into the 1950s. John Kennedy knew perfectly well that there was no missile gap. He used that as a campaign principle because he thought he could get elected that way. As soon as the election was over, he basically said, "There is no missile gap."

That left him vulnerable when the time came to decide how many Minuteman missiles to build, to the pressure from the military. McNamara and his people had figured out that you could destroy as much of the Soviet Union as you needed to destroy with about 300 warheads. He then proposed to Kennedy that maybe they needed 600, if you allowed for a 50 percent failure rate. The Air Force came up with the number 10,000. The Joint Chiefs worked that down to 3,000. Kennedy and McNamara then had to decide where in that range they would settle on how many Minuteman missiles to build. They could have settled on 600, but Kennedy, understandably, said, "Look, I campaigned on a missile gap. We can't do just 600 missiles."

So we ended up with 1,000 as a compromise. Then there were 54 Atlas and Titan missiles already in the arsenal. So you come up with this magic, seemingly very precise number of 1,054.

That's the way these decisions were made. There was, without question, not enough intelligence in the 1950s, until our first generation of spy satellites, to know for certain where the Soviet Union was.

McGeorge Bundy does point out in one of his books, however, that [Eisenhower](#) had a lot of experience with assessing, based on photographic evidence from planes. We had overflights of the Soviet Union going on all the time during that era, most notably the U-2s. They flew along railroad lines and rivers, because those are the places where you would build this kind of installation. They didn't turn up anything—except, of course, the cities where nuclear weapons were being built. They were aware of those.

When the first generation of spy satellites went up, Kennedy was amazed, as was everyone, at the fact that the Soviet Union basically had nothing. At the time of the Cuban missile crisis, as I said, they had four [ICBMs](#) [Intercontinental Ballistic Missiles].

But the central point of this to me is, four was enough. What McNamara told me was that even one, if it had hit a city in the United States, would have been something that was unthinkable from our point of view. Imagine if we had indeed invaded Cuba. McNamara learned many years later that there were 162 nuclear warheads in Cuba or in submarines around the Caribbean. Under those circumstances, if we had invaded Cuba, they would certainly have used them, and we would have had a horrible nuclear war.

What the Soviet Union had in the way of a strategic defense was really quite limited. I think you have to go back and look at the history of strategic defense and realize that it was an idea that was developed by political people, not by scientists and technologists.

**QUESTION:** Thank you for a masterly presentation. It was just great.

Until such time as this zero target of eliminating all nuclear weapons is reached that this group is aiming for, in your view, is there a strategic case for the United States retaining its nuclear weapons arsenal now? Or is this just a matter of inertia or abhorrence of treaties?

**RICHARD RHODES:** The process that the Shultz group has been envisioning involves a series of graduated steps. Even if we never got to zero, it would be valuable, strategically and in terms of safety, to go through those steps. To take the obvious one, both sides, Russia and the United States are still set at launch-on-warning, which means if we think the other side, based on our radar and our computers, has launched missiles, as in the Zbig Brzezinski story, we are supposed to launch ours so that they aren't hit, and therefore destroyed.

That is a terribly dangerous policy. There is no reason on earth at this point to continue it. That's something that both sides could do bilaterally, even without any treaties, that would make us all much safer.

That is almost number one on the Shultz group's list.

I don't think Henry Kissinger—and, I'm pretty sure, Sam Nunn—actually believe in the idea that we could ever get to zero. I know Bill Perry said at the meeting last week, "I still don't see how we can get to zero."

But it doesn't really matter if you believe it or not, as long as you do some of the other things. As long as there are nuclear weapons in the world, I assume we are going to have to keep a few. The question really is, how few do we need? How few would make us safe in every way? That answer has to be in the 10s or 20s. Some of the members of the group have proposed 1,000 on each side; others have proposed 500 on each side. I think those numbers alone, coming from people who are quite expert in their field, suggest just how flexible the whole thing really is.

So we could go a long, long way in that direction, make ourselves much safer, get a handle on all the fissile materials in the world, which is a big job—one we have been working on in the Soviet Union now for 17 years and have really begun to make progress on. Nunn says at least half of all the material in the Soviet Union is under secure control. But we still have the other half to deal with.

So there is lots that could happen and lots that everyone could get behind, regardless of where you stand on the question of whether or not there should be nuclear weapons.

Thank you.

**JOEL ROSENTHAL:** Thank you very much. We appreciate your handling this with such a sense of realism, but also optimism.

To watch this event on C-Span, [click here](#).

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