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JOHN S. FOSTER, JR. ORAL HISTORY, INTERVIEW I

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Signed by John Foster, Jr. on February 15, 1981

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ACCESSION NUMBER 81-82

## INTERVIEW I

DATE: December 3, 1968

INTERVIEWEE: JOHN S. FOSTER, JR.

INTERVIEWER: DOROTHY PIERCE

PLACE: Dr. Foster's office, Department of Defense, Washington, D.C.

Tape 1 of 1

P: Dr. Foster, I would like to begin by giving a little background information on you and asking if I have the correct information.

You were nominated by President Johnson as director of Defense Research and Engineering [Department of Defense] and confirmed by the Senate in September 1965. Prior to then, from 1948 to 1965, you were a physicist with the Lawrence Radiation Lab in Livermore, California, serving on the staff, and as associate director, and as director. Also, in the late fifties you served on several science advisory boards and panels for the Defense Department.

Is this background information correct?

F: Yes, I believe it is correct. I should like to check and see whether or not the Senate was able to confirm my appointment in September. I believe it was probably later in October, but we can look into that.

P: Just to begin with, when did you first meet Lyndon Johnson and what were the circumstances?

F: I first met him when coming to Washington to meet with the President for the first time with regard to his nomination of me as the director of Defense Research and Engineering. We met in one of the little side offices in the White House. At that time I recall that he seemed very tired and actually lay down on the couch while I sat beside him. He read my resume, and we talked for a few minutes about my background and on my growing up in Canada and then subsequently living in California, with a brief period during the war at Harvard University and overseas in the Mediterranean theater.

Following that, we discussed in some detail his concern over the fact that most of the research and development in this country takes place on the East Coast or on the West Coast. And it was at that time that he wanted me to promise to do something while I was in the department to try and encourage the development of research centers in the Midwest.

Of course, as soon as I came over to the department, I set to work on that task and today we have a program called Themis that has been exceptionally successful. It was requested by the President, and set up by Dr. McArthur, the Deputy Director for Research.

P: Does Themis stand for something?

F: No, it doesn't.

P: Is it spelled the way it sounds?

F: Yes, it is. I can supply you with some background information on that if you wish. In fact, there is a fair amount of it in the standard testimonies before the various committees.

P: How would you describe your present relations with Mr. Johnson?

F: I see him several times a year, usually with my wife. He's got a wonderful memory. He usually comments on the latest exchanges that I've had with members of Congress, and I always marvel at the pains he goes to make everyone feel comfortable and realize that he's rather personally familiar with their problems and activities.

P: I was about to ask you how you would characterize him. Could you elaborate on that a little further?

F: Well, I think of him as a rather earthy man who is well aware that from a point of view of science and technology we can accomplish a lot, but that occasionally it is quite important to inject into that system an appreciation for some of the simple considerations of health and safety of our people that are so frequently forgotten in the pursuit of more exciting research and development.

P: Has Mr. Johnson appointed you to any study groups, task forces, or commissions outside of Defense?

F: No, he hasn't.

P: Have you ever traveled with Mr. Johnson or been asked to travel somewhere for him?

F: No, I haven't.

Just a moment. Going back to the date at which I first saw the President with regard to my nomination, it was on September 9, 1965, and we'll get the date of the confirmation for you.

No, I've never traveled abroad or been appointed to special committees or commissions by the President.

P: On what occasions have you gone to the White House since your interview?

F: I've been to the White House on a number of occasions for social purposes. However, I recall one time going with Secretary McNamara, Harold Brown, Herb York, General Wheeler and others in connection with the decision that was being considered with regard to ballistic missile defense. This was in the summer of 1967.

P: What was discussed? How was the meeting conducted?

F: At that occasion, Mr. McNamara led the discussion for the President. He presented points of view that one could have with regard to ballistic missile defense, and in the end asked the former scientific advisers to the presidents and assembled military men to comment on their personal feelings. Neither Dr. Brown nor I made any comments at that time.

F: I do have some questions on the deployment of anti-ballistic missiles, but I'll bring that up later.

F: Okay, fine.

P: Dr. Foster, your position is considered the number-three job at Defense, sort of the chief scientist. How would you describe the dimensions of this position--what you do and whom you advise?

F: This assignment has three basic responsibilities. I have to generate the best possible program of research and development for the Department of Defense. Secondly, I have to present and defend that program and the associated budget to the Congress, and, third, I have to advise the Secretary of Defense on matters of technical military importance.

P: Do you see this position as an evaluator of service suggestions or as an initiator back the other direction to the services?

F: I think it's mostly the former, though from time to time there are notions that come to mind among the staff in OSD [Office of the Secretary of Defense] that are then put back to the services as suggestions as to how they might do the job better, or alternatives.

P: In the process of evaluating Defense programs and projects, what are your relations with the Office of Systems Analysis?

F: I've looked at Systems Analysis as an office that has two major characteristics. The prime characteristic, of course, is that they are concerned with the questions of force levels. A second characteristic, however, is that they are an office that has specialized in the screening of the many things that the services would like to do, those that we should do. Therefore, they tend to be critical in order to perform this discriminatory function. Each time I consider a research and development program I find it extremely helpful, both from the point of view of my office as well as my own responsibilities, to call upon the people in the Office of Systems Analysis for what you might call a devil's advocate view of the virtues and limitations of a particular program.

P: With the very large Defense budget, is it possible to avoid duplication?

F: It's certainly possible generally to avoid duplication. However, it's important to realize that particularly in the areas of basic research, or more basic research, one should at times have duplication. So one talks frequently about avoiding unnecessary duplication. At the other end of the spectrum where one has large systems costing many billions of dollars each, one has to be very critical in order to minimize unnecessary duplication.

Let me give you an extreme example. In searching for assured destruction, in generating a capability to provide for this kind of force capability, we have several different weapon systems. We have bombers, the B-52s; and we have missiles of the Minuteman and Polaris variety. There are three different weapon systems, each one of which could provide assured destruction. But we have three different types because primarily we are not convinced that any one of them is free from possible Achilles' heels from time to time.

P: Since you have been here and in this position have budget allowances for research and engineering declined?

F: No, as a matter of fact they've grown each year. However, just whether the budget is up or even in fact down one year to the next is determined actually by the sum of a lot of individual programs, some of which can amount to several hundreds of millions of dollars. Over a period of a year, the monies needed for a program can drop by a hundred or two hundred million dollars or increase by a hundred or two hundred million dollars. Then when one takes the sum of all these, the total budget should not be expected to go steadily up or remain constant, but in fact should be subject to rather small discontinuous jumps.

For example, the budget for this fiscal year, fiscal 1969, is approximately 7.5 billion dollars. For last year, it was 7.11 billion dollars. There is an increase, you see, of some four hundred million dollars. However, the year before the budget was 7.10 showing hardly any increase from fiscal 1967 to fiscal 1968. The difference, of course, between one year and another is then the result of the number of major programs, some going up, some going down, as well as what Congress chooses to do about the presidential submission.

P: Do these budgetary allowances for the different programs you've indicated that are going up and down become necessitated by the development within the program, or is it the effect of limitations that you've had to cut back on an area?

F: Generally one tries to fund programs at the levels that they really need. This is in distinction to the levels that the individual programmatic groups would like to have. We found that it's frequent that a program does not get going as fast as was expected, that the analysis of the results takes longer than people assume, and that the achievement of a particular milestone in a program frequently comes about only after one has had to pass over several hurdles. Therefore, the time to complete a project generally is greater than one thinks. In fact, the total dollars required to complete one are also larger even though one does not usually need quite as much money as one anticipates at the beginning of each year.

P: I think what I'm really trying to determine here is--I understand what you've told me--does this change in budgetary allowances affect various areas detrimentally?

F: I think each of the researchers would feel that they could use more money effectively. As a matter of fact, if one were just to make a sum of all of the amounts of money that all the researchers would like to have assigned, it would far exceed anything that either we or the Congress would feel could be made available to them. So one has to draw a line between making all the progress the technology permits and the availability of critical funds throughout the government.

P: How would you describe the weapons system research development? Does it come in spurts? I know this is a creative area, but it is cyclical? Do you reach areas where present technology does not allow you to go any further? Can you describe it?

F: The many fields that are involved in the research and development for military purposes certainly have, from time to time, periods where in a particular field very little will be accomplished despite aggressive efforts on the part of the researchers. Usually one can't invent on demand. These breaks come, and they come to those who are working harder and smarter than those who are not. And once one makes a breakthrough, it's quite frequent that a number of other breaks come with them. So there will be a run in a particular area and the work will be very prolific. Then we'll find that the vein dries up and we can't mine much from it. And people will search for other areas and they'll find another way to get around the problem. Then that will bear fruit for a while and then we'll turn to still another area. Sometimes when you go back to the old field, you find that the new technology that's available will permit you to do a job you couldn't do before. Then that area will again become productive.

So one just has to search constantly through the list of problems and possible solutions. And just because you couldn't find the solution in 1955 doesn't mean you can't find one now.

P: How does the time lag from discovery to application affect this?

F: Depends very much on the particular application that one has in mind. Sometimes it can go in almost immediately in a matter of a year or two, other times it may stay apparently dormant for five or ten years before being picked up. Just because you have a new idea or new phenomenon doesn't mean to say it's going to solve a problem.

F: Well, maybe this next question is a little irrelevant, but can you make a general statement that discovery and application are shorter now? Or is it dependent on the areas?

F: Oh, I suspect it's generally shorter because there are so many new avenues that have opened up recently in the last ten to twenty years that it's much more likely that when one sees a new phenomenon or has a new development that it will have [more] application today than it did ten or twenty years ago.



P: Does a good example of this come to mind?

F: Yes, if one thinks about the discovery of transistors, you see a myriad of applications there. The use of the laser, not only as a range finder but for communications and for satellite work and so on. Yet you see twenty years ago one couldn't have used the laser for satellite work. There were no satellites.

P: In your judgment what have been three or four of the most critical decisions in weapons defense since you've taken over this position?

F: Well, certainly the ballistic missile defense system, the Sentinel, was one of the major ones. The acceleration of the Poseidon System, the decision to go forward with the improved third stage of Minuteman, and the placing of a multiple independently aimed re-entry vehicle system on the top of Minuteman, the so-called MIRV system. Certainly the decisions associated with the whole of our attack submarine capability, to improve not only their sensors and noise levels, but also their weapons. Recently the effort to establish a satellite communication system and the introduction of the satellite warning system. I think all these have had a rather major impact on the technological capability and the future military operational effectiveness.

P: What in your opinion have been the most important research breakthroughs, and I don't mean this in terms of weapons systems. I mean this would be the actual application.

F: I think the research area, the laser has been a rather major breakthrough. The ability to detect the launching of missiles on earth from satellites in space is certainly a technological breakthrough, as I see it. The development of very large or powerful computers has changed the capability of ballistic missile defense and the concept of a long-range interceptor missile for the Sentinel System along with the hot x-ray thermonuclear warhead are what I think are notable technological breakthroughs.

P: During this past year in the presidential campaigns, charges of a security gap were made. Are we losing ground with Russia and our missile superiority ratio?

F: I think there the answer is dependent on what you think of in response to the question regarding superiority. If you think superiority is in terms of numbers of missiles, well, of course the Soviet Union has steadily increased the number of her missiles and the United States has had hers remain relatively constant. If you think of superiority in terms of megatons, well, the Soviet Union has increased her megatonage while the United States megatonage has actually decreased a little. If you think of superiority as having to do with the relative level of effectiveness of the forces, then the United States has had and still possesses a greater force capability than does the Soviet Union.

P: Dr. Foster, how would you evaluate the Chinese nuclear threat and the impending development of their delivery system?

F: I think the Chinese nuclear threat is rather similar to the Russian nuclear threat at the beginning. It was clear to us when the Russians went into nuclear technology that they were going into it not from the point of view of making some demonstration to the world, but from the point of view of becoming a world power. The development of the Chinese I think of as quite similar to the Russians and very different from the nuclear capability that is being obtained by France or is existing in Britain. The Chinese are going out after a first-class large nuclear force capability.

P: How would you rate their scientists?

F: Judging from their performance in the nuclear tests they've had, I think one would have to rate them equal of any of the countries in the world. In the few tests they've had, they've gone further than did Russia or the United States or Britain or France.

P: Since there are many, many intricate steps to launching a missile before it is on target, how high is the reliability factor of missile systems since they have never been tested in an armed state?

F: The reliability of the Minuteman and Polaris Systems generally runs in the range of 70 to 80 per cent. The actual uncertainty that's associated with the last step, that is to say, the firing of the nuclear warhead, is in my opinion very small. Every time we make a test of a missile from a Polaris boat or from Vandenberg [Air Force Base, California] test stand, we are checking every aspect of the missile including the fusing and firing sequence as the re-entry vehicle goes into the target area and the warhead is called upon to fire. Then to assure that those signals generated in that sequence will in fact detonate a nuclear warhead, we take such a warhead and put it underground and send it those kinds of signals, and in fact demonstrate that it does go off.

So we make the overall test evaluation in two steps: one is to test out all of the missile aspects and the re-entry vehicle aspects, generate the proper signals to detonate the warhead and assure ourselves that those signals were generated and the performance obtained. Then we send those same signals down to the warhead underground and see that it gives the required yield.

P: In actual testing, have we ever lost any missiles?

F: Lost in the sense we don't know where they went? No, we've lost them in the sense that they have blown up.

P: Do we have enough fail-safe checks to avoid nuclear holocaust in the event of misinformation?

F: We can't design a missile that will work reliably when commanded and yet fail to go off if the command is given in error.

P: Well, what about checks to stop it?

F: There are checks to make sure the command is not given in error. These checks assure that there will not be a release of nuclear weapons unless the president so orders it.

P: What is the time lapse for recalling an order?

F: Once one pushes the button, so to speak, on the Minuteman missile there is no way to recall it. There is, however, as you know, a few hours available for recall in the case of an aircraft.

P: I want to go back while we are on this missile aspect and potential nuclear threats. In retrospect, do you feel that the Test Ban Treaty was a milestone in international relations, or have we suffered from it?

F: I've thought about that question a number of times. I must say that the outcome of that treaty is better than I, for one, would have judged. Yet since we have not had an opportunity to live under the alternative, I can't compare whether we're really better or worse off. I'm certainly encouraged by the fact that the continued underground weapons-testing program permits us to prove out the reliability and effectiveness of our weapons system, as I indicated a moment ago. And I'm hopeful that it has helped to contain, to some extent, the enthusiasm for other powers to get into the nuclear weapon business. But none of us are in a position to say just how much more assurance we might indeed have if we were able to test our weapons systems in the atmosphere.

P: In your judgment, is the nuclear non-proliferation treaty in our national interest?

F: Yes, I believe it is.

F: Can you give me your reasons?

F: Yes. I think in a rather general way it puts additional pressure on nations around the world to think once more before going into a nuclear capability.

[End of Interview I portion of Tape 1]