

INTERVIEW WITH DR. EDWARD TELLER  
6 JULY 1987

(This interview took place over dinner at the Cosmos Club in Washington, D.C., between 1730 and 1900.)

DR. TELLER (T): I would like to say to begin with that I do not believe that I have been particularly influential in changing the President's mind or influencing him. But whatever I know, it is yours.

LT COL BAUCOM (B): Thank you, sir. The first thing I would like to ask you about is the President's visit to the Livermore lab which you mention in your recent book, Better a Shield than a Sword. You were not there at the time?

T: I was.

B: Was this the first time you had met the President?

T: Yes. As far as I remember, when he moved into the Governor's [of California] mansion, I asked for an interview. I saw him there; that was the first time I met him. I did nothing but invite him to visit Livermore which he then within a short time proceeded to do.

B: There are indications that this visit stimulated his interest in strategic defense. What did he see during his visit to Livermore.

T: That is my idea. At that time, you know, we were preparing for the [SPARTAN] shot in the Aleutians. It was a rather a big nuclear explosion (a few megatons) which would destroy

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incoming missiles with gamma rays at some distance from the explosion. Governor Reagan visited our laboratory and received a somewhat extensive briefing of what we were doing--perhaps a couple of hours. He probably was shown around and saw the actual exhibits at the laboratory--you know how these objects look. That I do not remember, but it is usually done and probably occurred. But even if it is done, I usually don't go along on these tours through the museum. But I was there for the briefing and then following the briefing for lunch. The visit took place during a morning. And if you are interested and you write to me, I can find out in the records of the laboratory what is known about it. We were then working on that shot, and I believe a discussion of the shot was a part of the briefing. I recall that in the briefing of about two hours, Reagan did ask a few questions--perhaps half a dozen or a dozen--which were by no means quite obvious questions, but in a field that must have been quite new to him he saw the salient points.

B: Was this shot designed specifically to test the effects of gamma rays on warheads?

T: To test the yield and some of the effects--the function of the bomb which then was executed a few months later. Now please don't believe me on this. Write to me, and I will try to verify it from the records of the lab.

B: I will do that. I'd like to ask about a humorous story in your book. You tell about an Army colonel who said that they kept a goat at Aberdeen Proving Ground and offered a \$10,000 prize to anyone who could kill the goat with a death ray.

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T: Yes. I remember this.

B: You go on to tie the death ray idea to the modern laser.

T: Yes. Of course!

B: It is a pretty obvious connection.

T: Yes. It is. This tie between science fiction and the laser is a rather obvious point. I made it.

B: This brings me to the point of the X-ray laser. I don't know how much you can tell me about it without getting into classified information, but why was the X-ray laser so important. Wasn't it one of the factors weighed when the decision was made to push for the development of a strategic defense system.

T: Lasers were first developed for long-wave radiation--for microwaves. The first "MASERS" were developed by Charles H. Townes in the 50's. A few years later, short waves, visible and infrared, became known. The same kind of thing in the much shorter wavelength region, X-rays, is much more effective and in another way also less effective. Less effective because it does not penetrate the atmosphere; more effective because it penetrates any surface to a relatively shallow, but not very shallow, depth. When it so penetrates and if the intensity is high, then it blows up that part of the surface. This blowing up produces a shock which is equivalent to some TNT release of energy and is thereby capable of destroying the object that has been hit. Now, as much as I said to this point, is quite obvious. The possibility has existed. I for one did not believe it could be done. Some of my friends, searching for a variety of ways in which defensive action could be executed, proposed experiments, one of

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which succeeded. And the success has been repeated. Now, I think wrongly and superfluously, this work has been classified. I am permitted to say that X-ray lasers do work. I am permitted to say little more about it, which I think is mistaken classification but one by which of course I have to abide. It is by no means the only progress, but it is perhaps the most surprising progress in our definite knowledge concerning defense: the knowledge that X-ray lasers are feasible.

B: I assume that the breakthrough here is that the X-ray laser is more destructive than the conventional light laser.

T: It is indeed more destructive, depends less on surface properties of the target, and converts more of its energy into concentrated power. There are some indications--I cannot say that they are unmistakable--that the Soviets are indeed interested in the same thing. To produce such an X-ray laser of the appropriate power, I know of no other procedure except by using a nuclear explosion and converting its energy into X-ray energy which can then be very sharply directed. Now this has to be exo-atmospheric and from the outer atmosphere it again can go only outside the atmosphere. It can penetrate into the very high portion of the atmosphere.

B: So, it could not be used as a boost-phase killer.

T: It could be used for a boost-phase killer, but it cannot be used deep in the atmosphere. Boosting goes on after the missile has left the atmosphere.

B: Does the X-ray laser destroy itself when it operates? In  
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other words, the nuclear explosion goes off, and the X-ray lasers are created instantaneously as the system destroys itself.

T: Right. One can talk about multiple effects.

B: I saw that in a proposed design that would have rods that aim the X-ray lasers in different directions.

T: Now, the details I cannot tell you. I am not saying that this is the most useful, the most hopeful approach. It is another approach, and it did impress me as showing that we must continue to take into account novel approaches.

B: Your mention of novel approaches brings up one point I believe you make very well in your book: the Soviets are certainly doing some novel things. For example, there is the Soviet technique of using a laser to burn a hole through the atmosphere through which a particle beam can then be fired. We learned about this technique from the Soviets.

T: Yes. One possibility, and it is a different one, perhaps not quite as novel and impressive as the X-ray laser, but very good nevertheless, is a technique in which a laser does burn a tunnel in the atmosphere through which an electron beam then shoots.

B: Was the X-ray laser that brought you back into contract with Mr. Reagan who was now the President?

T: What actually happened was that shortly after I became convinced of the feasibility, at least in principle, of the X-ray laser, I was on a television program with Bill Buckley--Firing Line. I did not plan it, but Bill Buckley, in a way with which I guess you are familiar, questioned me about the various ways

in which to prevent nuclear attack. And I told him--I said on television, indeed, defense was possible. Bill Buckley, said, in that case, and that conversation sticks in my memory, he said, why don't you go to your friend President Reagan and ask him for \$30 billion. And I said, unfortunately, I have not seen President Reagan since he occupied his present office. That was, I think, August 1982. And also, I said, I need only one percent of the sum. That was supposed to be for immediate follow-up experiments. Or something like this; I don't recall exactly how I formulated it.

And then, a few week later, I got a call from Jay Keyworth who was then the President's science advisor. It turned out that the President saw the program and asked that I should see him. So, I did go to see him. There were maybe a half a dozen people or a few more in the room; there was no opportunity to explain anything in detail. The President asked if I thought a defensive system would work, and I said that our present indications are good. And then he went around in the room without any detailed discussion, and some doubts were also expressed (not by me of course), and as I left the President, and you know his style so it won't surprise you, made the remark that the man who had proposed the submarine was disregarded. This, of course, implied that this suggestion would probably not be thrown out.

Then, quite a few months later, Admiral Watkins called me in and I had lunch with him and his staff and he asked me specifically about the X-ray laser. Jay Keyworth was, of course, informed about the details and he may have told the President or

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Admiral Watkins or anyone else. With Admiral Watkins I talked in real detail about the X-ray laser, and he said he would do something about it. This was about four weeks before the President's speech in March 1983.

So, it<sup>n</sup> this way, I believe, the concept of the X-ray laser may well have influenced the President's thinking. But, again, I must emphasis<sup>ze</sup> that the X-ray laser is one real hopeful possibility, but certainly not the only one.

B: One report claims that you had seen the President four times. This is incorrect, then?

T: No.

B: You had only seen him once.

T: Neither is right. I know I have seen him at least three times depending on how you count them, but I saw him only once before the March 1983 speech. I saw him a total of two times on the matter of strategic defense, but both times quite briefly and in neither case was there a thorough discussion. What the President probably got from his advisors to whom in turn I talked was probably much more relevant than what I managed to tell the President in these short meetings.

B: You saw him twice on X-ray lasers before the March 1983 speech?

T: Only once.

B: Then you saw him after the speech?

T: More than a year later, in fact I think it was in the summer of 1985 that I saw him a second time on that.

B: Did you have anything to do with General Graham's High

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Frontiers initiative?

T: Yes.

B: In his book, High Frontiers, General Graham talked about a meeting in fall 1981 with national leaders including you and Mr. Karl Bendetsen, and pointed out that Bendetsen played a very important role. Can you elaborate on this, especially on Bendetsen's role?

T: Yes. I was invited to these meetings by Bendetsen.

B: He is an old friend of yours?

T: No. He is now, then he wasn't. He is one of the trustees or supervisors of the Hoover Institution where I am working. He invited me to the High Frontier meeting. I wholeheartedly agreed with the general purpose of the High Frontier plans. I thought that the approach was a little too simple and could be defeated too easily. According to my memory, Karl Bendetsen proposed that the general idea of defense should be pushed and a group should be appointed to look into the details of the implementation.

B: To the best of your knowledge, did this group see the President?

T: Let me continue. Danny Graham insisted that his particular simple recommendation be explicitly recommended, and that went into the report. To my knowledge, I was present in their general meetings, but for the reasons I have mentioned, I did not sign this report. I remember having seen the President, I believe, after March 23, together with several other people, including Karl Bendetsen, but I don't believe Danny Graham was

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there, but he might have been. Anyway, as far as I remember on that occasion, the talk was general and if I said anything it was not more than one sentence. It would have been something like "I believe that strategic defense is possible."

B: Is there anything else about the strategic defense initiative that you think would be important for the historical record?

T: I don't think I have much more information. I wrote the President a couple of times, but nothing of particularly great importance.

B: Were you surprised by the President's speech?

T: Completely. I should have been prepared considering my interview with Admiral Watkins, but in fact I was not.

(At this point, the discussion turned to a consideration of philosophy and Chinese history based on chapters in Dr. Teller's recent book, Better a Shield than a Sword.)

B: I understand that you had considerable influence on Dr. Keyworth. To the best of your knowledge did his dissatisfaction with the way things were going on strategic defense cause him to leave his position as scientific advisor to the President?

T: I don't think this is so. The way I understood it, the job was very demanding, both on his energies and on his finances. And I suppose this is not surprising. He felt, so I understand, that he could not continue in his position and do what he should do for his family.

(The discussion turned again to a review of some of the ideas in Dr. Teller's book.)