INTERVIEW WITH
PROFESSOR HANS BETHE
ITHACA, N.Y.
~~FEBRUARY~~ 3 March 1986

WILLIAM LANOUETTE: In 1962, Leo Szilard tried to enlist your ? in his Angels Projects, this was a project that allowed scientists from Russia and the United States to meet informally to propose policies. At the time you didn't think that was necessary, why not?

HANS BETHE: Well, as I recall, looking back at the letter that I wrote Szilard, I thought that enough interchange was going between Russia and the United States on official channels and through Pugwash, that it was not necessary to have an additional organization to do this. I am now at present I am of a different opinion and I think the idea of having a, a standing group of high level people, meet between the two countries, appeals to me at this time. Of course, we have gone another 25 years and conditions are different but I think a standing group of, of responsible people, not speaking for their governments however would be a good idea.

WL:, In 1945, you testified before Congress about the May-Johnson Bill which would have kept atomic energy under the military and at the time the alternative was the McMahon Bill which would have created an indedpendent atomic energy commmission, In terms of the development of nuclear weapons do you think today that there was much difference between those bills.

HB: Well, I think that the May-Johnson bill was much more restrictive than the McMahon bill so even today I would say that the McMahon bill was a great improvement over May-Johnson. One special case was that the May-Johnson bill mainly indulged in outlining all the terrible property, no the terrible punishments that we would suffer if we didn't say the right thing. And it seemed to be more intersted in teh punishment than in getting anything done. And in this respect the McMahon bill was very much more sensible. So I

was happy to testify for the McMahon bill before a Senate Committee which was, which included Senator McMahon as the chairman

(TELEPHONE RINGS)

and quite a number of other senators

(TELEPHONE RINGS)

WL: We got his description of May-Johnson, if you could continue by describing again the difference of the McMahon bill and why that you think today that it was a preferable course to take?

HB: Well, at the time, in late 1945, there were two bills before Congress. One was the May-Johnson bill which would leave the direction of atomic energy in military hands and the other would be, was the McMahon bill which would create a civilian agency, the Atomic Energy Commission, to direct all atomic energy work. I testified very happily, in favor of the McMahon bill, before a senate committee, which was presided over by McMahon himself. I was invited to do this by some scientists, mostly Dr. Condon and Leo Szilard.. Condon, actually was present at the testimony and I think the testimony went very well and in the end the McMahon bill became law.

I think it was a good thing that this was so. The Atomic Energy Commision with all its faults, was, I believe a good institution and it was much more accessible to the public than the military would have been.

The general advisory comittee, for instance, was a civilian committee and ver=y independent and it would have been almost impossible to have a similar committee advising the military institution. Now, in the end, of course, the atomic energy commission did a lot of work on military matters, perfecting the nuclear weapons and this was considered their primary function for quite a long time. The did also something about production of material and about nuclear reactors.

I suppose the military may, might have done the same. I don't know. But in the end I think the McMahon bill was a great improvement over May-Johnson.

WL: Was that the first time that scientists banded together with a group like the Federation of American Scientists to make their case?

HB: The Federation of American Scientists was founded the day after I testified to the Senate. And the coincidence was not accidental because several scientists had been called to Washington to talk to the McMahon committee of the Senate and ah, therefore lots of us were there and so it was a good opportunity to get us all together and to start the Federation of American Scientists.

WL: What was Szilard's role in the founding of the Federation?

HB: I don't remember that Szilard had any role.

WL: He was an early member and he tended to try to get coalitions of scientists together going and say " if all the people in the Clinton Lab will agree to this we can sign them on" and he was something of a matchmaker.

HB: I am sure Leo Szilard was a matchmaker. I am sure that he talked a lot to people at the various laboratories to join the Federation and I don't know very much about it because I was located at Los Alamos at that time and Los Alamos was closed to Szilard. In fact it was closed to anybody who wasn't actually working there. So, I can well believe that Szilard did a lot of talking at the Metalurgical Lab in Chicago and then at Oakridge. But it is not something I know.

WL: You worked with Szilard in the Emergency Committee of Atomic Scientists, the one that was headed by Einstein, what was he like in that committee?

HB: Just one moment.

(WL: Repeat the point about the citizen access. I think it was just before that that it went on.)

HB: Well, ah, (are you ready?)

Well, I think the AEC had the great ad, advantage over the military that citizens had a lot of access to the proceedings. Therer was the general advisory committee of which Oppenheimer was the chairman and ah, there were many ways in which citizens were invited to come in and give their work -- smaller committees to decide one or the other problem like building a new accelerator. And I think all this would have been much more ponderous if at all possible if it had been under the military.

The ah, of course the Atomic Energy Commission did consider it its first duty to build nuclear weapons. That was what the President and the country expected. So most emphasis was paid to that. But they also worked on reactors, they also sponsored the high energy accelerators which made the United States the leading country in that field, and I don't know how this would have gone with the military.

The, one difference I think would have been that it would have depended very much on the Secretary of Defense and one secretary would have favored the civilian projects and another would not.

So, I believe on the whole it was a good idea to put the AEC under civilian leadership.

WL: After the War, you were a member of the Emergency Committee of Atomic Scientists which was headed by Albert Einstein. Szilard was also a member. Can you recall what his activities were for that committee?

HB: I was a member of the Emergency Committee of Atomic Scientists after the War. The chairman of that committee was Albert Einstein bat the real moving force was Leo Szilard. I think it was he who had the idea of having this committee. It was he who determined more or less the agenda of the committee together with a very nice gentleman who was the executive secretary, so to speak, of the committee, Mr. Haller Schaffner, who worked terribly hard to get money for the committee to schedule the meetings and so on. But it

was all done, more or less, under the instructions of Leo Szilard.

The committee, I think, was founded in the first place to get money for two already existing institutions. One was the Bulletin of the Atomic Scientists, which exists to the present day and which I believe has been the foremost mouthpiece of the scientists who wanted to limit nuclear weapons.

And the other was a committee for atomic information which had its headquarters in St. Louis. Ah, it combined its propaganda against nuclear war with a lot of propaganda against nuclear reactors, which I greatly disagreed with. I think nuclear reactors are a fine thing and should be built. They should be built safely but they are very important for the energy of this country and other countries.

So, ah, the Emergency Committee was, was invented to collect money for these two institutions and money was collected very well.

Albert Einstein was very good at that. He had a very simple way of talking which went over beautifully with the public, especially with rich people and so in one afternoon he collected $75,000 which you should multiply by six or so as half a million dollars of money . And this was done easily and charmingly and it was Szilard who had the close relation to Einstein so that he could discuss with Einstein what should be done.

What the committee did apart from collecting money, was to meet and discuss the state of the world and see whether we as scientists could make any sensible statement. This was very close to Szilard's heart and he always liked to have some statement come out of the Emergency Committee which could then be published. Usually we agreed with the ideas that Szilard had. But, most of us, that is th other member of the committee, didn't think we should make so many statements. That statements were being made by lots of other people at the same time so why should we add our own.

WL: (How are we doing on time, do we have for an answer? Switch tapes)

HB: Joint Committee on Atomic Energy of the Congress and to the Atomic Energy Commission -- the Commission in turn asked their general advisory committee under Oppenheimer to form a judgement on it. I was doubtful for a short while but then I decided it would be a terrible thing to increase further the power of nuclear weapons. They were certainly powerful enough and so I decided to do some speaking and writing against the H-Bomb.

Of course this couldn't be done before the decision was taken. The decision was taken by President Truman in January of 1950. Right after that I went ahead and wrote an article which was published in Scientific American, why I considered it unfortunate to have this further escalation of the power of nuclear weapons. I was sure if we did it, the Russians would do it too. In fact, just after discussing it, this was before Truman's decision, I happened to come to New York and go up on the roof of one of the buildings and I was thinking if an H-bomb is developed and if the Soviets were to throw one on New York, all this would vanish immediately.

Szilard was of the same opinion. We came to the opinion quite independently although we did see each other at a meeting of the Emergency Committee, but later on Szilard that some speeches on the radio should be given against the H-bomb. So he arranged a, a hearing at the radio Chicago, that one time and he asked me to come to that and also Fred Seitz, who later on became president of the National Academy (of Sciences). So the two of us and Szilard came to the radio station and we Seitz and I said more or less the obvious things, namely that the H-bomb would be a terrible increase of the power of nuclear weapons, maybe a hundred fold, maybe a thousand fold and they were already too big. So that was more or less the obvious thing to say.

So, Szilard had to trump that and had to get us, go us one better and said "well in addition to everything else, if you have an H-bomb, then you can surround the hydrogen by cobalt which will become intensely radioactive

and will then be scattered over the countryside and will make it uninhab., uninhabitable and will kill everybody who is in the neighborhood. Now, I thought this was an unwarranted escalation and which of our talks and it was probably a bad idea to talk about something still more destructive than the H-bomb. The H-bomb was bad enough. Why go beyond it? Why devalue the H-bomb in a way by that?

And it was one of the occasions where I thought Szilard hurt his cause by going too far!

WL: Should we talk next about the alternative cities and Stowe, Vermont? Was there another point you wanted to make about Szilard's efforts perhaps getting in the way of his success? I think you made it very well with that point that you devalue the H-bomb by creating this awful cobalt bomb.
Is there anything else you wanted to say about that?

HB: Yes. I think so.

(ROLLING)

HB: Szilard was very much devoted to the cause of peace. And he tried all sorts of possibilities. Very often in the sense of making war more frightening than it actually is and one example of that occured in 1961. The international situation as rather tense because the Soviets were building the Berlin Wall at that time and it was a question whether the United States would respond to that by force. So, one could not say for sure what the future would bring.

There was certainly the possiblity in many people's minds, that this could lead to war and if it led to war it might degenerate into nuclear war. Now, Szilard was very much concerned that if there was nuclear war that it should be kept in bond, in bounds and the ah, for instance, one obvious thing might have been that we bomb a small city in Russia and then they would bomb a bigger city in the United States and soon it would escalate until all the country was destroyed.

Well, so there was a meeting, a Pugwash

meeting at Stowe, Vermont at which both Szilard and I were and by the way, quite a number of Russians, some good Russians, in fact. And Szilard at that time came to me and said "Well, we have to make a list of all the cities in both countries in order of size so that if a nuclear, if nuclear weapons destroy one city in one country, then the other country can answer by destroying it an exactly equivalent city. So there are about a hundred cities over a hundred thousand population in the United States and likewise in the Soviet Union so let's arrange them by size and also importance and make these lists available to the statesmen on both sides.

WL: Was this a good example of him being too rational for his own good?

HB: It was certainly an example of Leo's being too rational for his own good.

WL: Why is it, to change the subject, why is it that the Germans did not build an atomic weapon during World War II and the United States succeeded and what was Szilard's role in that?

HB: Well, the Germans worked on uranium and on extracting uranium during the Second World War. Some of the German surely wanted to build a nuclear bomb, others did not. Heisenberg, for instance, claims, has claimed all his life that he never wanted to build an atomic bomb and he tried to convey that to Niels Bohr in (??) in which the two completely misunderstood each other. However, many people in Germany did want to build a nuclear weapon.

Well, there were many reasons why the Germans failed and the United States succeeded. The most important was probably the much bigger industrial capacity of the United States. But there was one important additional reason, namely the Germans concluded at an early time that you could not build a nuclear reactor out of graphite. That you had to use heavy water which was very difficult to obtain.

A nuclear reactor is a stepping stone to nuclear weapons of one particular type. And anyway a stepping stone in the development of the whole field.

Well, why did they conclude that graphite could not be used for a nuclear reactor? They had used impure graphite. Now, in this country, Fermi and Szilard also found a similar result to begin with. But they both said that probably the absorbtion of neutrons by graphite was due to impurities. And so Szilard remembering his early training as a chemical engineer said "Oh, yes. To make graphite you use electrodes which contain boron. And so I will go and look."

Well, the manufacturers use boron as in manufacturing graphite. And indeed he went around to all the major graphite manufacturers and found that indeed most of them did use boron and boron absorbs neutrons to a fantastic degree and he finally persuaded one of the chief manufacturers to make some graphite without the use of boron and that graphite then turned out, by Fermi's experiments to be suitable as a reactor medium

So Szilard contributed in a very major to the early success to perhaps the most important branch of the Manhattan District.

WL: I'll ask you next what Szilard is remembered for in arms control, you could mention the Council for a Livable World and whatever other points you think are worth raising. Perhaps his persistence in having exchanges of people from the two Superpowers which he was working on from about 1947 on and I don't know what else you think is really a legacy that he leaves in terms of trying to control these weapons but I'll let you decided that.

HB: Szilard did one very major thing for the permanent fostering of arms control and that is to found the Council for a Livable World. This has been extremely effective and after Szilard's death it remained very, very effective mainly in trying to bring before the public the necessity of arms control and also by supporting for election Congressmen and especially Senators who were devoted to arms control. This, I think, is a permanent legacy of Szilard.

Another legacy is that he kept all of us interested in the subject. So that in 1957, when the President's science advisory

committee was founded, many of us remembered what Szilard had said and we had special subcommittee on arms control. I believe that Szilard had a lot of influence on all of us on that committee. He was not himself a member and later on that that committee, in turn, sponsored the Arms Control and Disarmament Agency, a part of the government.

(WL: How are we doing for time? Change tape)

HB: Leo Szilard was a very complex personality. He was one of the most intelligent people I have ever known. His mind worked quickly and profoundly and he was able to come to ideas that most of us appreciated only after many hours of talk. This was his strength and of course also his weakness. He was always ahead of his time. He, his ideas often were expressed in paradox and the paradox was not understood. The ah, and but on the other hand, many of his ideas did became understood and were followed by many people. Many of his ideas were purely humanitarian. And I'm thinking in particular of time when I first met him which was in England in 1933 or '34 when Szilard was a major force, perhaps THE major force in the Academic Assistance Council which was concerned with bringing refugee scientists from Germany out to other countries and to England in particular.

It was financed by some rich Englishman and many of the scientists supported it by very much by their work.

Well, Szilard was really the soul of this. He was everywhere trying to find other people who needed help, trying to find places. He somehow combined in his mind a network of knowledge, of open places and scholars who needed support. So, I think this was wonderful work -- direct benefit out of it himself.

WL You said in our last conversation that he was like a particle which would disintegrate and reappear. Do you remember that? Could you make that analogy?

HB: He would appear quite unexpectedly at many different places when we had scientific discussions and so we decided that Szilard really was like on of the modern particles which could be annihilated, disappear and then

could be created again. And so we used to say. now Szilard has again materilized in front of us. It was claimed that he was seen at several places at once, during this English period.

WL: What did you think of Szilard's petition not to drop the bomb on civilians in 1945?

HB: Szilard was again the leader in the movement at Chicago, at the Metalurgical Laboratory to persuade the United States government not to drop the atomic bomb on cities in Japan. That certainly created a big stir and there was a lot of argument in favor of his opinion. I think it was hopeless from the beginning that the U.S. government would agree to this.

The course of the use of the atomic bomb was essentially determined by the time the atomic bomb was ready. The bomb was taken to Tinian in the Pacific and two bombs were dropped and essentially the whole development had been decided no, nobody could have had any influence on it.

In the course of hindsight, I somewhat have the impression that it was necessary to drop at least the first bomb because we have read very much in the last 40 years about the decision of Japan to surrender. It was mainly made by the Emperor who generally did not concern himself with such decisions. But when he heard of the terrible casualities and destruction by fire Emperor Hirohito in a cabinet meeting said "This cannot go on! We cannot tolerate anymore. I cannot expose my people to more of this." And that was the basis of the surrender.

I don't believe a report of a demonstration (of the bomb) would have had that influence on the emperor. He probably would not even have been told. So, I believe in hindsight it was unforuntately necessary to drop at least one bomb. The second, I believe, was not necessary.

I think it's a good point but it doesn't really relate to Szilard does it?

Okay, Szilard always wanted to have Russian scientists and American scientists get together to discuss the political issues of

the time and he was convinced that scientists had a moral rational opinion, less colored by nationalism and more supported by the facts about atomic weapons. And I fully agree with that. However, the ah, difficult is that scientists cannot and should not speak for their countries. The meetings that ah, Szilard arranged to a large extent, the Pugwash meetings, were very useful, because especially in Russia, the Russian participants in the Pugwash meetings reported back to their government. They had much closer connection to their government than we do. And this had some good consequences and I think is going to be useful for the future.

They, at present, Pugwash is not as important as another scientists meeting which is the meeting of members of the national academies of the two countries. It's not the whole academy, but just a small group, some six or eight from each side who get together twice a year, once in Washington and once in Moscow and they speak rather freely. Not as freely as people speak at the Pugwash meetings because the academicians are semi-official and so they speak somewhat more as representatives of their country. I think it's a very good idea. I hope it will be further increased and improved. I think scientists have a lot to say about weapons, about nuclear weapons, what to do about them. But of course they cannot and should not make the final decision.

- END -