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Peenemünde Interviews Project: Konrad D. Dannenberg 11/7/1989 (Tape 1 of 2) A

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WEBVTT

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<i>MICHAEL NEUFELD</i>: I wanted to ask you, is your father an army officer, at the -- ?

<i>KONRAD DANNENBERG</i>: Right.

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<i>MICHAEL NEUFELD</i>: And uh, was he killed in the First World War? [[crosstalk]] He was fortunate --

<i>KONRAD DANNENBERG</i>: No, no, he survived and --

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-- of course he stayed then in Hanover, he was during the war already in Hanover, my mother was there. I had a sister; she died during the war.

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And he worked for the post office.

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He was on long-term duty in the army and the German army then normally provided employment in the post office, the rails, or some federally-run organizations. So he was working for the post office when I grew up. And uh --

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<i>MICHAEL NEUFELD</i>: He didn't continue on in the Reichswehr.

<i>KONRAD DANNENBERG</i>: Right, he did not.

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And, uh, after I had seen these tests, of course we became quite interested in rocketry. And we had our own little rocket field in Hanover. It was not quite as well known as the one in Berlin where von Braun worked, but you probably know there were many of these amateur rocket societies.

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Apparently people after World War I at that time, they were interested to look a little bit broader ahead, and there was not too much going on in Germany, we had the big inflation even, during those years.

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And so people, I think in general became quite interested in Raumfahrt, in space exploration -- we had the movie 'Die Frau im Mond' in the late 20s or early 30s -- must have been around that time.

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<i>MICHAEL NEUFELD</i>: It was the end of 1929.

<i>KONRAD DANNENBERG</i>: Ja, and that all enthused us, so --

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-- when I finally heard about Peenemünde - I learned about Peenemünde from a fellow I'd been working with, Püllenber, Albert Püllenber,

who's also still living in Germany today. He lives in the Ulm area.

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And he was really the head, so to speak, of our rocket activities in Hanover. He was the most active one. He later on even married a girl who had a -- kind of a shop that he could really build on a bigger scale, rockets, launch facilities, and things like that.

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He did not decide to come to this country after the war, he decided to stay over there. And he took even after the war his own rocket activities up again.

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And I learned through him about Peenemünde, of course he couldn't tell me 'we build rockets here,' --

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-- that was top secret, so he indicated in his letter to me between the lines: 'here is some work going on, which I'm sure you would like. And why don't you try to get away from whatever you are doing now and come and join me here in' -- and I think the name at that time was Karlshagen or some place close by where most of the people lived.

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And when the war started - I had graduated in the meantime, I went in Hanover to school, as I mentioned earlier.

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And maybe one thing is even of interest - I went purposefully into the area of diesel fuel combustion, diesel fuel injection because we had learned in Hanover that that was at that time one of the big problems -

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How do you really properly introduce your propellants, into your rocket chamber? How do you mix them properly? And what do you have to do in order to get good combustion?

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So in order to learn more about it, I started diesel fuel injection - of course no one taught anything about rocketry, but that was the closest field to it.

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And when the war ended, I was a volunteer in the German army - though I initially was drafted in the German Army - but they sent me to a horse-drawn anti-tank battalion and that was for me enough reason that I finally got out of the army.

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I could use the fact that I as a technical man with a Dipl.-Ing. in engineering, that I shouldn't serve in a horse-drawn company and so I managed to get out of the army.

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And I worked at that time before, just before the war, for the VDO - they build tachometers. You, if you, drive a Mercedes you probably have a VDO tachometer in your Mercedes.

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Of course during the war, they built all kind of war-time instruments - mostly radar-type or communication-type instruments.

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And they got me out of the army, they justified it with, they needing me.

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And once I was back at the VDO, I didn't have too much of a problem to get from the VDO then transferred to Peenemünde.

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So that's the way I finally came to Peenemünde in the summer of '40. Early summer '40.

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<i>MICHAEL NEUFELD</i>: Can I, uh, I want to ask you a number of detailed questions before we even get to that stage --

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When your experiments with - You participated in these rail car experiments in what would have been -- [[cross talk]] -- 1928.

<i>KONRAD DANNENBERG</i>: Well I watched them, I didn't participate.

<i>MICHAEL NEUFELD</i>: OK. You were there.

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That was Opel, was it?

<i>KONRAD DANNENBERG</i>: That was Opel, ja.

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<i>MICHAEL NEUFELD</i>: That wasn't Valier - 'cause I know that they had gone their separate ways, --

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-- just after the rocket car business -

<i>KONRAD DANNENBERG</i>: Valier had also been in town. He had given an inspiring talk. He was a pretty good talker. You probably heard about him, ja?

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<i>MICHAEL NEUFELD</i>: I've written an article about him --

<i>KONRAD DANNENBERG</i>: And he was a little bit the von Braun type, ja? He could go to the public. He could talk to them. He could convince them.

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And he did a lot of work, of course, ja? But these tests, you are right, they were done by Opel.

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<i>MICHAEL NEUFELD</i>: When did you begin working with Alfred Pöhlenberg -- in that little rocket group --

<i>KONRAD DANNENBERG</i>: Well that must have been in the late 20s.

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It was before we saw the railroad tests and they were, I think, in '28, '28 possibly '29.

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And we had started to work on our rockets before that, but that really gave us some additional new spirit again.

<i>MICHAEL NEUFELD</i>: Really?

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<i>KONRAD DANNENBERG</i>: Of course, we didn't have any real funds, we had to spend our pocket money. And we started out with solids - so we bought solids. You could buy them in Germany in those days.

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Fireworks rockets. We took them apart, we cut them open, built them in bigger rockets, and that was really the beginning of the work.

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And then we finally became aware of Oberth's book. I had also read already a relatively early Goddard's book - how to 'Reach Greater Altitudes by Means of Rockets'.

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And we decided that, yes, the right way to go was really to use liquids. So we switched relatively early in the '27 - '28 time period to the use of liquids.

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And we were fortunate enough - I was living in Hanover. Hanover was a fairly large city and we had an air liquefaction plant in Hanover. And separating air you can easily make liquid oxygen.

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And through a professor at the university, an aeronautics professor, Pröll, we got permission to use some of their liquid oxygen. And to use liquid oxygen as an oxidizer.

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<i>MICHAEL NEUFELD</i>: This was 'proll' as P R O umlaut -- ?

<i>KONRAD DANNENBERG</i>: P R O umlaut, double L.

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<i>MICHAEL NEUFELD</i>: Double L -- okay.

<i>KONRAD DANNENBERG</i>: And he is dead now. He was already an old man at that time. So he is not alive anymore. But he wrote a

number of books and he was interested in rocketry probably even from the view point of application to airplanes.

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You probably know, right after World War I, Germany was not allowed to build powered airplanes. So people strapped solid propellants, and later on liquid propellants, onto sail planes to get up into the air.

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That was one method - there were other methods to get up into the air.

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And actually, in Hanover, we had a contract from one of these sail plane people, Espenlaub, to build a rocket for him - a liquid propelled rocket for him - and to eventually deliver it. But we had so many problems, we never came to the point of delivery.

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<i>MICHAEL NEUFELD</i>: Yeah - This, all of this, sounds very familiar. You see, I've written an article about that period in the late 20s.

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And I know that - the sail plane idea really took off after the rocket car, Valier, and so forth, in 1928, in April '28.

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So, ah, but you-- You're very sure that you and Alfred Püllenber and - anybody else in that group? - started before you ever even heard of the rocket cars and so forth?

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<i>KONRAD DANNENBERG</i>: Right, that came later. I'm pretty sure about that. We had been working on it before that.

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<i>MICHAEL NEUFELD</i>: Because I - I don't know of any other private rocket experiments that were going at that time. So if that's true, you would be, maybe, the first.

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You know, Raketenflugplatz didn't start 'til 1930.

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So, that I don't know of any other groups starting so early --

<i>KONRAD DANNENBERG</i>: Well, were there not other activities going on?

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<i>MICHAEL NEUFELD</i>: I don't know of any private rocket groups. Nobody has mentioned it.

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Winkler really, you know, only started working with this right around '27, '28, as well.

<i>KONRAD DANNENBERG</i>: Ja, I think we started at about the same time. And we had heard about Winkler, we didn't meet him at that time.

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<i>MICHAEL NEUFELD</i>: Were you a member of the Verein für Raumschiffahrt?

<i>KONRAD DANNENBERG</i>: We had our own - GEFRA (Gesellschaft für Raketenforschung). And that was a Hanover group.

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<i>MICHAEL NEUFELD</i>: So you didn't feel it was necessary to join the VfR, and get Die Rakete, the journal?

<i>KONRAD DANNENBERG</i>: Well it also was too far away, ja?

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Normally I wouldn't go to Berlin, so normally we wouldn't really have any contact with the people. We knew that they had a club, similar to our club.

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<i>MICHAEL NEUFELD</i>: Yeah, of course that was later. I was thinking about the Die Rakete, the journal -- you didn't see that journal, huh?

<i>KONRAD DANNENBERG</i>: Yeah, I hadn't even thought of it that our activities may have been the very early ones

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<i>MICHAEL NEUFELD</i>: Yeah, because I know the Raketenflugplatz really only starts in late 1930. Of course Winkler was experimenting. I don't know if he even fired up a rocket engine before 1929 or so, I don't think, even on the ground tests. You know, he started working only after he became involved with the VfR and Die Rakete and so forth. So that would make you very, very early.

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<i>KONRAD DANNENBERG</i>: Well, as I told you earlier, I'm a little bit poor with remembering specific dates. I mentioned Püllenbergh earlier. He's still living in Germany. Maybe once you are over there again you might want to talk with him, if he's still alive. He's in pretty poor health, and also his memory is not quite as good any more, but he might even send us some documents.

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We published documents. We gave talks at that time. That was one way of raising money, to give a talk, to invite people to the launchings, to pass the hat around, to get a few extra dollars, and this was really all the money we had, and our own spending money, which was also very short, of course.

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<i>MICHAEL NEUFELD</i>: You went to a Gymnasium?

<i>KONRAD DANNENBERG</i>: No, I was in the Oberrealschule, which taught only English and French, no Latin and no Greek.

<i>MICHAEL NEUFELD</i>: And more science?

<i>KONRAD DANNENBERG</i>: And more science, physics and things like that.

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<i>MICHAEL NEUFELD</i>: So you started with the University of Hanover when, in 1931?

<i>Konrad Danneberg</i>: In, er, 31. And that's when I really stopped my rocket activities, ja? So I'm pretty sure it must have been before that time, because I didn't do any major work at that time. Püllenbergr ever once in a while tried to involve me, but being a student, you are so busy with new things that I really didn't have the time.

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And I also served at that time one year in the army, so that must have been from 32 to 33, I would say. I think it was still before Hitler took over, so it must have been 32, and er, my dad wanted me to become a teacher, and I was not interested in teaching at all, so I was really not too hot about it, and that's why I left the university to have a year to think about it, and after I came back in 33 then I really went in the technical fields.

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<i>MICHAEL NEUFELD</i>: Were you in the Technische Hochschule?

<i>Konrad Dannenberg</i>: Ja.

<i>MICHAEL NEUFELD</i>: The first year as well?

<i>Konrad Dannenberg</i>: Both times. It was at the same university.

<i>MICHAEL NEUFELD</i>: So you were in the Technische Hochschule Hanover --

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<i>Konrad Dannenberg</i>: Right.

<i>MICHAEL NEUFELD</i>: From 31 to 32. Then you were out one year 32, 33, [[crosstalk]] and then you started again--

<i>Konrad Dannenberg</i>: Right.

<i>MICHAEL NEUFELD</i>: And then I started again and then I went into strictly technical fields. My dad had consented in the meantime, "Well, if you really don't like teaching..." and also teaching jobs were not that plentiful any more.

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When I initially went to school we had still a lot of unemployment, ja. 31 was very bad over there. [[crosstalk]]

<i>MICHAEL NEUFELD</i>: The peak of the, the peak of the chaos-- [[crosstalk]]

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<i>Konrad Dannenberg</i>: And there was practically no job you really could get. That was really the main reason for me to go to the university: I couldn't find a job, and then my dad felt if you are a teacher, you, once you are hired you have a lifetime position.

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So that's why he wanted me to go into that field. But as I said I wasn't too hot about it, and I would have been a high school teacher, I would have had to know how to play the violin, you had to take music, that was one of the subjects you had to dig into, and I really didn't like that at all.

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<i>MICHAEL NEUFELD</i>: So what was your er, what kind of engineering did you er, [[crosstalk]] major in--

<i>Konrad Dannenberg</i>: Well of course the first few years we are basic engineering, ja, and only the last few years I then concentrated on combustion engineering for diesel engines, and I was even after I had graduated for about a year maybe two years, an assistant to a Professor Neumann in Hanover, and he was running the Verbrennungskraftmaschine Institute.

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And I was an assistant to him and that was already just before the war, it was in 38--

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<i>MICHAEL NEUFELD</i>: Ok so when did you--just to pin this down--you went back in 33; when did you finish again? [[crosstalk]]

<i>Konrad Dannenberg</i>: 36 or 37. Probably 36, and then I stayed for a good year, a year and a half, in the Institute as an assistant to Neumann, and our specific task there with a group of students with whom I worked was to convert one of our old automobiles--we had a 1905 Daimler, not Daimler-Benz, just Daimler, Mr. Daimler still did his own work at that time-- and we converted that to Flüssiggas, to propane gas--

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<i>MICHAEL NEUFELD</i>: Ok, liquid gas.

<i>Konrad Dannenberg</i>: Yeah, we had gas, relatively small oil well close to Hanover in Nienburg, and besides the oil they also recovered some natural gas--

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<i>MICHAEL NEUFELD</i>: The name of the place was Nienburg?

<i>Konrad Dannenberg</i>: Nienburg.

<i>MICHAEL NEUFELD</i>: N-I-E-N-B-U-R-G?

<i>Konrad Dannenberg</i>: Right.

<i>MICHAEL NEUFELD</i>: Ok I think I've heard of it [[Crosstalk]]

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<i>Konrad Dannenberg</i>: And there was a factory which made on the one side gasoline from the oil, and also from the byproducts they got some propane and filled it in propane bottles.

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And it became clear already that we wouldn't have enough gasoline during the war, so there was quite a drive on from the Hitler regime at that time to go into those fields, and that's what we did, and, well I worked on it until the project was finished, and then I left and went to the VDO as I mentioned earlier: [[spelling in German]] Fow, day oh. [[Crosstalk]] the Komeda outfit.

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<i>MICHAEL NEUFELD</i>: And that was in Hanover?

<i>Konrad Dannenberg</i>: That was in early 39. I left Hanover in early 39 and went for about half a year to the VDO, so I was not there very long and then when the war started-- [[Crosstalk]]

<i>MICHAEL NEUFELD</i>: Where was the VDO located?

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<i>Konrad Dannenberg</i>: That was in Frankfurt, Frankfurt, Main, and when the war started I was then pretty soon drafted into the army because I was serving in military reserve duty, and of course all these people were immediately called and that must have been late August, 39. And from then on I was for about a year in the army, and then early next summer I finally got my transfer to Peenemünde.

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<i>MICHAEL NEUFELD</i>: So did you serve in a campaign, in that 39, 40 did you serve [[Crosstalk]] in Poland or France--? [[Crosstalk]]

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<i>Konrad Dannenberg</i>: We walked on foot through all of France. We started way down south, the south of Strasbourg, even at the Swiss border, really, and then we walked behind the Maginot line almost all the way to Dunkirk, but Dunkirk had fallen or the Allied forces had gone back over the channel, ja, so we never made it all the way to Dunkirk, but we stopped and there we turned around and walked all the way back again to Strasbourg, and in Strasbourg we then finally went back over the Rhine and we were stationed in Freiburg, Baden.

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<i>MICHAEL NEUFELD</i>: So you would have been transferred just after the successful conclusion of the French campaign--[[Crosstalk]]

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<i>Konrad Dannenberg</i>: Right, right, right after that-- [[Crosstalk]]

<i>MICHAEL NEUFELD</i>: French and Low Countries-- [[Crosstalk]]

<i>Konrad Dannenberg</i>: and my company later on was transferred to Russia, but I never went with them to Russia, so before that happened I got out of the army.

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I worked for just a little while for just a few months for the VDO again, and then I got dienstverpflichtet.

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You probably have heard that term: dienstverpflichtet already. So Peenemünde really called me, ja.

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And that's why I said it was easy. Peenemünde had a fairly good priority at that time so they could call on people they knew were interested in that field and so it was really called dienstverpflichtet to Peenemünde.

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<i>MICHAEL NEUFELD</i>: Now 'cause I raised the question I guess I get this straight: as far as Püllenbergs was concerned he wrote you then, before the war--? [[Crosstalk]]

<i>Konrad Dannenberg</i>: Well we had, we had continued correspondence. I had known him quite well. His dad worked also for the postal office, so our dads were fairly closely acquainted, and due to that connection I had also correspondence with him, not very frequently, maybe for Christmas and Easter, or so, but we stayed in contact, and that's the way I found out about the activities in Peenemünde.

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<i>MICHAEL NEUFELD</i>: When did you sort of figure out what was going on up there? That there was something going on? [[Crosstalk]]

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<i>Konrad Dannenberg</i>: Well of course, after I had heard about it I seemed to recall I made first a visit, and had to introduce myself. I met Walter Thiel at that time, Thiel is the number two man after von Braun before the bomb raid; he was killed in the bomb raid,

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and he apparently was interested, and he then dienstverpflichtet me. He then called me to Peenemünde.

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<i>MICHAEL NEUFELD</i>: So you would have visited the first time and then gone away again that one time that-- [[Crosstalk]]

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<i>Konrad Dannenberg</i>: I think I went back home again and then I finally got my final assignment. And of course at that time when I was up there then I learned basically what they were doing.

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<i>MICHAEL NEUFELD</i>: From ... In the past all you had known was that Püllenbergs was doing something probably regarding rockets.

<i>Konrad Dannenberg</i>: Right, right [[Crosstalk]]

<i>Michael Neufeld</i>: You didn't know what and did you even know approximately where he was? Or was that secret too?

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<i>Konrad Dannenberg</i>: No, no, I had lost the contact with him until he wrote to me again and announced that this kind of work was going on there. Interesting work for me was going on there.

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<i>MICHAEL NEUFELD</i>: That would have been about 1940, already then.

<i>Konrad Dannenberg</i>: That probably was early in 1940.

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<i>MICHAEL NEUFELD</i>: So at, you got called then through that connection and through your going up there and meeting with them you got called to Peenemünde

<i>Konrad Dannenberg</i>: Right.

<i>Michael Neufeld</i>: And in late 1940? Something like that.

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<i>Konrad Dannenberg</i>: No, that was early summer of 1940, so I would say June, July, so relatively early in summer.

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<i>MICHAEL NEUFELD</i>: Ok. So that would have been almost at the very end of the campaign then, right? The French campaign.

<i>Konrad Dannenberg</i>: Was the French campaign was that not even in 38?

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<i>MICHAEL NEUFELD</i>: No, the French campaign was just over, in, June 1940.

<i>Konrad Dannenberg</i>: June 1940. Then it was just at the end of the French campaign.

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<i>MICHAEL NEUFELD</i>: Ok. So you probably went when you just after got back from that campaign.

<i>Konrad Dannenberg</i>: Right.

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<i>Michael Neufeld</i>: You got called into, you were probably assigned to the Versuchskommando Nord, right, the Army unit. [[Crosstalk]]

<i>Konrad Dannenberg</i>: I guess so, ja.

<i>Michael Neufeld</i>: I mean, you don't, do you remember that name of that unit--

00:23:23.000 --> 00:23:51.000

<i>Konrad Dannenberg</i>: Well, Versuchskommando Nord was really a military unit. It was not in existence at the time when I got up there. Military people were only assigned to Peenemünde in 42 or so. So in 40 it was strictly, there were some army people: Dornberger was there and a few other captains with him, but the main workforce, were really civilians, like I: dienstverpflichtet.

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<i>MICHAEL NEUFELD</i>: So you were, officially, so you were not then assigned as an army person-- [[Crosstalk]]

<i>Konrad Dannenberg</i>: No, I had left the army.

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I was civilian [[Crosstalk]] I was civilian. Right.

<i>MICHAEL NEUFELD</i>: So you had been effectively released from the army, put back on reserve, you were put back on army reserve,

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and you were dienstverpflichtet, sent to Peenemünde, then in the summer of 40. I just want to get this straight. See, I'm not even sure about Versuchskommando Nord, when it started, when it existed --

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<i>Konrad Dannenberg</i>: It must have been two years or so later. At that time Hitler had declared the A-4, as we called it in those days, of high priority, and then we could draw on army personnel. And we even, there was even an autoroute to the army to assign all technically qualified people to Peenemünde.

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But that happened only later. That was at the time after the A-4 had been declared again of high priority.

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You have probably heard already: at some time it was on then it was off again and then it was on again so that kept on changing. And in the beginning it was strictly an army project.

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Really the party had nothing to do with it; it was strictly run by the army, and that's why of course initially we got army people. Later on we got also a lot of air force people. After the air force got also involved with the Wasserfall particularly.

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But in the early years it was strictly an army activity, and, as I said, at the time when I got there, it was strictly a civilian activity.

00:25:19.000 --> 00:25:32.000

And er --

<i>Michael Neufeld</i>: You didn't see the army officer, I mean of course there was an old group of people from Heereswaffenamt who had come through Dornberger, Zanssen--[[Crosstalk]]

00:25:32.000 --> 00:25:42.000

<i>Konrad Dannenberg</i>: Some of them, a few of them were there but a relatively small group, and they did mostly managerial work: they administered the whole organization. They were not technical people.

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I would even say Dornberger was probably the only technical man. You probably know he had an engineering degree.

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<i>Michael Neufeld</i>: I think Zanssen was an engineer as well.

<i>Konrad Dannenberg</i>: Zanssen could have been one too. Ja.

00:25:53.000 --> 00:26:02.000

But all the others were regular army officers, and so they didn't really participate in the development as such. They administered.

00:26:02.000 --> 00:26:18.000

<i>Michael Neufeld</i>: They were basically in a base commander office at that level. So you were then taken into Thiel's group. He must have just actually have come from Kummersdorf not very long before-- [[Crosstalk]]

00:26:18.000 --> 00:26:33.000

<i>Konrad Dannenberg</i>: Ja, he was still fairly new, I seem to recall, and probably that's why he was interested to hire additional people, ja? That's why he was interested for me to come up after I talked to him and told him I had a certain background in combustion engineering, and he was looking for people like that.

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. And for that reason of course he put me after I was up there right away on the job to develop the injection units of the A-4 engine.

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You probably have seen it, the way we have it out there. We have 18 individual elements, Töpfe, as we called it, that initially mixed the propellants and then of course the 18 elements mix again in the main chamber. And my first job was to work on these individual elements,

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and for that purpose we even had a smaller engine, a 1.4 tonne engine. Each and every one of these elements has 1.4 tonne tube, and we did all the basic, the initial research on the smaller unit, the one four tonne unit. And I also worked on the one tonne unit which was strapped to airplanes,

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JATO: jet assisted take off.

<i>Michael Neufeld</i>: Starthilfe.

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<i>Konrad Dannenberg</i>: Ja, and that was a very similar unit; it had also a somewhat conical head, then a combustion chamber about that long, and-- [[Crosstalk]]

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<i>Michael Neufeld</i>: Was that about a foot long?

<i>Konrad Dannenberg</i>: Ja, and then a nozzle, a rocket throat area which gave us a lot of problems, so I spent also quite some time on solving all these burn-through problems,

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and they normally burn through in the throat area where you have of course very high velocity and still fairly high temperatures.

00:27:54.000 --> 00:28:14.000

<i>Michael Neufeld</i>: Er, let me tackle one of these things at a time. When you came the Starthilfe--of course this is one of the things I have to figure out--that Starthilfe project, JATO project, that was still going, was it?

<i>Konrad Dannenberg</i>: Right.Right.

<i>Michael Neufeld</i>: That was just at the end of development or you still were finding problems--[[Crosstalk]]

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<i>Konrad Dannenberg</i>: Well we built already the ready units, and they were being used, they were being flown, for some reason or other I never really quite understood why--maybe the reason was these units were developed by the army. And they were then turned over to the air force, and the air force apparently was not too impressed with them.

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So they really, I think to my knowledge they never got really into major operational use. Some of them were used, there were certainly some demonstration flights, some of which I saw--

<i>Michael Neufeld</i>: At Peenemünde West

<i>Konrad Dannenberg</i>: At Peenemünde, Peenumünde West, ja-- [[Crosstalk]]

00:28:48.000 --> 00:29:00.000

<i>Michael Neufeld</i>: At the air force Platz, huh? [[Crosstalk]] That was the test, so the test at Peenemünde West was certainly later than what, after you got there--[[Crosstalk]]

<i>Konrad Dannenberg</i>: Right, they were later, after the unit had been more or less developed.

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<i>Michael Neufeld</i>: So that would have been later in 1940 probably--

<i>Konrad Dannenberg</i>: Later 40 and possibly even 41, possibly even into 42.

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<i>Michael Neufeld</i>: I know that the fact they decided to go over to a hydrogen peroxide one that was developed by Walter --[[Crosstalk]]

00:29:21.000 --> 00:29:30.000

<i>Konrad Dannenberg</i>: [[Crosstalk]] That could be one of the reasons. I hadn't even thought of that. You may have a point there: they are simpler. They are not quite as efficient, but you drop them anyway, ja, so if they are a little bit heavier, it's not all that critical.

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<i>Michael Neufeld</i>: Yours was based on liquid oxygen--

<i>Konrad Dannenberg</i>: Liquid oxygen and gasoline--

<i>Michael Neufeld</i>: And gasoline not alcohol--

<i>Konrad Dannenberg</i>: To my knowledge not alcohol; it was gasoline-- [[Crosstalk]]

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<i>Michael Neufeld</i>: So it was liquid oxygen and gasoline, of course that meant handling a cryogenic fuel in the Starthilfe--

<i>Konrad Dannenberg</i>: And that's of course pretty tough as you realize.

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<i>Michael Neufeld</i>: So it had its disadvantages, but, yeah as you say it may also have been army versus Luftwaffe, but, when you came that one tonne engine was still having problems.

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<i>Konrad Dannenberg</i>: Both of them had still major problems. One tonne for the Starthilfe and also the 1.4 tonne unit, and one of the major problems was really the efficiency, the combustion quality was just not there,

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and my main job was to find out how to improve the injection system. I don't know how well you know the design. There were fuel nozzles all around, I think, four rows of fuel nozzles. Some of them injected directly; some others atomized the fuel, and generated fuel mist, and we shuffled these around quite a bit.

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And we finally came to a design where lots of these holes could be just drilled into the wall; they were just straight holes, and we had only a few nozzles which atomized the fuel to improve or to quicken up the combustion,

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and that worked fairly, pretty, pretty well. And also when we finally put all these elements together, due to the additional mixing, apparently the combustion quality was pretty good when you used the whole, the larger system. There you have the picture.

00:31:20.000 --> 00:31:42.000

<i>Michael Neufeld</i>: Yeah, this is from Gerhard Reisig's article, series, and of course, you know he has a fairly detailed discussion of those propulsion issues on there, but you were, so there were still more refinements needed on that basic injector--had the Topf that went into the A-4--
- [[Crosstalk]]

00:31:42.000 --> 00:31:51.000

<i>Konrad Dannenberg</i>: Right, also the LOX injection, you probably know the LOX nozzles in the center of the unit, and there is only one

LOX unit to keep it simple, and that also, that had only straight holes in it.

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And the straight holes sprayed and they were supposed to spray over the entire unit so that you had LOX droplets right next to each and every fuel nozzle.

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<i>Michael Neufeld</i>: So I remember that from the pictures that there was like a little dome in the center, a dome was where the LOX came, was injected, and so that you just drilled straight holes there, you didn't try to drill special nozzle holes--

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<i>Konrad Dannenberg</i>: But the holes were under specific angles, therefore it's not straight spheres, spherical surface. It had some steps in it, ja. So that the holes could be easily drilled under a 90 degree angle.

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[[Crosstalk]] And that was one of my first tests to develop the LOX injection system and the fuel system.

00:32:40.000 --> 00:32:50.000

<i>Michael Neufeld</i>: How did you proceed in the test process, doing that? Did you just-- [[Crosstalk]]

<i>Konrad Danneberg</i>: Purely experimental-- [[Crosstalk]]

<i>Michael Neufeld</i>: Did you just try something different each time that you did it-- [[Crosstalk]]

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<i>Konrad Dannenberg</i>: Right, right, no, we worked with the University of Dresden, and they were specialists in fuel injection. And they consulted with us and they made recommendations for new designs and things like that, so it was not only my doing and my experimenting, but we had some scientific help, really-- [[Crosstalk]]

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<i>Michael Neufeld</i>: Uh huh. That was, was that the institute of Professor Wewerka, or was there somebody else--? [[Crosstalk]]

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<i>Konrad Dannenberg</i>: No, Wewerka was turbo pumps, and I don't right, offhand even recall who was the head there. I don't think it was Wewerka.

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<i>Michael Neufeld</i>: Yeah, I have some documents regarding Dresden, but I don't have them with me, so I don't remember who was who. I know that there was a whole group of people there, and they had there was one of your-- [[Crosstalk]]

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<i>Konrad Dannenberg</i>: We had Küttner there who was quite active and spent a lot of time in Peenemünde, but he was basically still stationed in Dresden. We had Lindenberg there. I saw Lindenberg's name. He was the very first one to die in this country in Fort Bliss still, and he was permanently stationed in Peenemünde.

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So he did practically all his work there, and again he helped in all these design activities.

<i>Michael Neufeld</i>: Officially, though, he remained at least for a while, an employee of the Technische Hochschule, Dresden, and not--
[[Crosstalk]]

<i>Konrad Dannenberg</i>: I think he did.

00:34:08.000 --> 00:34:19.000

I think he did, ja.

<i>Michael Neufeld</i>: Officially worked in the Institute at Dresden, if not he was there. The other guy was Küttner--

<i>Konrad Dannenberg</i>: Küttner, ja--

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<i>Michael Neufeld</i>: Were they involved from the beginning when you were there?

<i>Konrad Dannenberg</i>: Yeah, they certainly were relatively early, relatively soon involved.

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Now I don't know if they were there ahead of me. Again Thiel had all these contacts, ja, and he invited these people, he wrote the contract with these people, and it must have been around the time when I got there.

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<i>Michael Neufeld</i>: Yeah, cos I, I've seen the documents that indicate right in September 39 they brought Dresden in, and in fact in another folder, I don't think this one, I have the document that indicates the discussion at Kummersdorf between Thiel and a number of people from Dresden-- [[Crosstalk]]

00:34:59.000 --> 00:35:11.000

<i>Konrad Dannenberg</i>: Yeah, Thiel was really the one who had these connections, I'm sure he wrote the contract, though he provided the basic gist for the contract, and they probably had contracting people to actually write the contract.

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And you probably know we worked of course quite extensively with universities. Universities and also private industry.

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{SPEAKER name="Michael Neufeld} Yeah, I think the university angle: there needs to be a lot more done with that, and has been. I think that's a whole area of research that nobody has--everybody, every book states that well there was some university work, but that's one of the things that I want to cover, um--

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<i>Konrad Dannenberg</i>: And they wrote a lot of contracts. There may even have been some contracts in your stake, there, that were written by Dresden. Reports on injection, what kind of designs to use, what kind of designs were successful.

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- And I also started at that time, well, it was even while I was still in the university, I started to use a lot of N-A-C-A reports, you know before NASA we had an N-A-C-A, and I read quite a number of the reports written by a Mr.



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