

An Interview with

CURT HERZSTARK

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Conducted by Erwin Tomash

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Nendeln, Liechtenstein

ENGLISH TRANSLATION

Charles Babbage Institute
The Center for the History of Information Processing
University of Minnesota, Minneapolis

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Abstract

Herzstark, an Austrian inventor and manufacturer of calculators, describes the development of the Austrian Calculating Machine Manufacturing Company (Rechenmaschinefabrik der Austria Erstanden Compagnie) and his subsequent work in the industry. The company, founded in Vienna by his father, Samuel Herzstark, in 1905, introduced the first electrically-driven calculator based on improved designs of the Thomas Arithmometer. Herzstark describes the disruption of the industry during World War I, his involvement with the company after the war, competition with American companies, and his first invention, a mechanical memory for holding subtotals, which appeared in 1928. Herzstark managed the company in 1930 and began work on his own design for a hand-held calculator. With the Anschluss of 1938, the company was again converted to war production, and produced custom gauges for German tanks. Herzstark, a Jew, was able to avoid arrest until 1943, when he was sent to Buchenwald concentration camp and worked as a technician. He recounts his arrest and internment, and how he completed the design of the CURTA hand-held calculator, a prototype of which was produced in Weimar, Germany, by Rheinmetallwerke at the end of the war. The Prince of Liechtenstein bought the design and the calculator was initially manufactured by the CURTA division of Contina AG of Liechtenstein. It was produced until 1972, when the electronic calculator forced it from the market.

CURT HERZSTARK INTERVIEW (ENGLISH TRANSLATION)

DATE: September 10, 1987

INTERVIEWER: Erwin Tomash

LOCATION: Nendeln, Liechtenstein

TOMASH: I am Erwin Tomash. I'm here with Mr. Herzstark and also a young gentleman who is acting as our interpreter. And what is your name please?

BURGLER: Mr. Burgler.

TOMASH: Mr. Burgler. We will, however, record all the German as well. As I've explained that we have a German translator at the Institute.

HERZSTARK: Then I will begin in German. I was born in Vienna on the 26th of January in 1902, a child of the parent Samuel Jakob Herzstark and Marie Herzstark. The marriage was a civil marriage, because my father was born a Jew, and my mother was a true Christian. But they were both free spirits. My father left Judaism but he had no affiliation and remained without a creed. And my mother left the Catholic church and joined the Lutheran church, and the children were brought up in the Lutheran church, because it was a pleasant religion. My parents were both free-spirited and very modern.

My father lived in America for a short time in 1895 and 1896. He wanted to find his father again... His father was Benjamin Herzstark and came from Danzig. Benjamin came to Vienna in 1860, where he tried to establish himself. He did not like it, and he did not find a real profession. Because of this he decided to go to America to try his luck. His wife, whose name was Stefanie Raeches(?), was a daughter of a Jewish physician. Raeches(?) is a Spanish name, isn't it? She came from the Krakau area. Benjamin Herzstark went to America. He and his wife had two children. He went to Denver, Colorado, because at that time in 1870, one could still stake land claims [Gruendstuecke Geschenk bekommen] even as a tradesman and get established and begin working. He went to Denver, wrote a letter to his wife, in which he was very hopeful that she could come over soon. She did not hear anything further, and then received a semi-official notification, that he had died of blood-poisoning from his bootnail.

So the Widow Herzstark remained in Vienna by herself with two children, my father and a girl, who was older than my father. My Aunt Ursaline, studied teaching and became a teacher. People urged her to become a Catholic. She then became acquainted with a Jewish man, a very handsome man by the name of Simon Probe. He was from Grazichof near Brodic from Skadizich (?) and with him, she had three children, three boys. Unfortunately she died from a hemorrhage during a fourth birth. These children were good friends of ours, because, of course, my father was their Uncle.

My father was born in Vienna in 1867, and went to the normal grade school and then five years of High School. His mother ran out of money, so he had to interrupt his studies, and begin a sales apprenticeship in a factory, which produced catalytic converters for water faucets and such. So he received practical experience not only in sales but also in filing, turning and boring. He learned everything there. Yes, it is also interesting, that in this High School, which was called Hauler(?) Gymnasium, and was in the second district of Vienna, as a youth he had taught a student German and Latin who would later be President Masurek [Czechoslovakia]... That was also a curiosity. That was just by the way. He interrupted his studies when he was 15 years old, and was made a teacher. He did that very well, and then took on a wide variety of positions, because he wanted to learn a lot. He worked in an arm chair factory, he was in sales, but then came the required military service. In the military he only had to do one year, that is -- a one-year stint, because he supported his mother. That was in 1888 or 1889. There was almost a war in Galizien because of the Battenberger incident in Bulgaria. After military service he again accepted a wide variety of positions.

In 1895 he went to America to see if he could discover something about his father, but was not successful. While there he received a position with the Remington company through sheer chance. He worked in a department where typewriters were produced, and was there for about a year. He stood out there somehow because of his talent, and people advised him to go back to Europe, to the general factory of Remington-Burroughs. This was the Glogowski company, which had central offices with maybe 50 affiliations in Vienna and Berlin. Thus, he began to get into the business machine field. He was very capable. He was, for example, the one who sold the first Burroughs machine for the Glogowski company to the Viennese Post Office Savings Bank in 1900. He would later build many machines. In any case he became acquainted with many other types of machines, in addition to typewriters. He soon learned that there were calculating machines, four-function machines; in other words, machines that can multiply, divide, add and

subtract, (to be sure no printing), and they were produced in Germany in Glashütte, and also in Paris by a company by the name of Thomas. Luck brought him to Glogowski in Berlin and he traveled there between Berlin and Vienna, taking care of business. He became acquainted with the calculating machines built in Glashütte, which were then the state-of-the-art. These machines were unconventional. In addition, he saw that different things on this machine could be further improved, so that they would be more saleable. Soon he was obsessed with these ideas, and began to wonder whether it was indeed possible for him to produce such a machine independently.

The following was the result: one of the customers of the Glogowski company was a banker by the name of Gustav Perger and he often visited the company. He became familiar with my father, of whom he had a very good opinion, and he suggested that they set up a factory for the production of calculating machines together. In fact he had an ulterior motive; he had a son who was rather sickly and he wanted to provide him with a living with a strong colleague. Thus the first Austrian calculating machine factory was established in Vienna in 1905-6. The factory's name was Austrian Calculating Machines Manufacturing Company. Gustav Perger invested 50,000 Krone. His son was in charge of the bookkeeping department and my father was in charge of the technical and sales areas, and wielded executive power. And so began the first production of calculating machines in Vienna.

In the mean time, my father had studied the calculating machines of the day and had seen where they could be improved. The first thing he did was to build a number of improvements into the machines that were produced in Glashütte. He did something else important. Glashütte had a well-known pocket watch factory. There was a young expert there by the name of Johannes Hairad(?). He was a Huguenot, who was very capable and was familiar with pocket watches of the time. My father brought Hairad to Vienna as Master [Foreman] in the new company. The result was that the machines produced by the new Austrian company were produced with great precision from the very beginning.

BURGLER [for TOMASH]: Were the first machines, that your father built based on the Remington machines?

HERZSTARK: No. Remington's machine was a typewriter. The calculating machine, that we made, was a multiplying machine based on the Thomas system.

TOMASH: Oh, yes, Thomas, the French Arithmometer. Thomas de Colmar.

HERZSTARK: My proof is in so many of the papers that I have. You will see some literature; many days won't suffice to really study them thoroughly...

BURGLER: It takes many days to see everything here... He has so much stuff to read.

HERZSTARK: ... Before I go on I'll give you a quick glimpse of a few pictures now. This is my father and me in 1936 just before Hitler came to Austria. That is me, when I was the Director here Liechtenstein of the factory where I directed the building of the CURTA. This is one or two years later, that was in Hamburg at a meeting. I made a presentation there in Hotel Atlantic. There was already a lot of literature about the machine. I mean, I don't know, to what extent you know that. There are probably 20 articles about it, scientific also. So here are the pictures. Everything belongs to you now.

BURGLER: It's all yours.

TOMASH: Oh! very good, thank you.

BURGLER: He's prepared.

HERZSTARK: Yes, yes, I have prepared. You have come only once to Europe; I've been here 86 years already.

TOMASH: Very good, okay, so then your father built a factory...

HERZSTARK: ... in 1906 in Vienna and produced calculating machines following the Thomas system. And in fact he made improvements on these machines. He built the machines according to the Thomas system plans, but with keys instead of levers. Also he electrified them. We still have documents showing this from 1910; it was the first electrically driven machine. You didn't have to crank or pull a lever anymore. Now you could type in a number and then the second number and it multiplied automatically and returned the carriage. That was done in 1907. The

machine could also divide automatically.

And I was photographed and shown off as a miracle child operating that machine. As I was saying, my father built the first factory, in Vienna, in the sixth district at Luftbadgasse 17, and Master Hairad was in charge of inspecting the final production steps. The machine distinguished itself with a very high quality level, from the very beginning. I myself have seen machines in exhibitions that are still functioning, that are 30, 40, and 50 years old. This factory soon began to work with great success.

In 1907 the young son of the banker Perger poisoned himself. He was unfortunately very sick with syphilis. One day he came into the office very depressed, went to the bathroom, came out screaming, acted as if he was drunk and then died in my father's arms. After this, the banker lost interest in the factory, and suggested to my father, that he become the sole owner. My father agreed. The factory, as far as I know, had been established in 1905 with 250,000 [?] [see page 4] Friedenskrone.

In order to understand how much the purchase price was, please realize that at that time a captain earned 300 Krone and an egg cost, I think, 5 Kreuze, and a worker earned, maybe, 40 Kronen a week. In any case, the factory was established and the banker's son died. So my father took a risk and took over the debt. By 1911 he had amassed enough capital to pay off this debt including 7 %, 7 1/2 % interest.

When the banker's son had died, my father asked my mother to join the firm. She was a very smart woman. She had a unique position from 1903-7 with an exporting firm, Gustav Karhitz, in Vienna. This was an export firm which exported to South America. She advanced from the bookkeeping department, and in her last year earned 700 Kronen a month. My father said to her, "Okay, now you have to stop working there. I need you in the factory, the younger Perger unfortunately has committed suicide. Come over to me." She did that, and became part of management, as head of the accounting department. She had, of course, five or six girls and helpers but she conducted the accounting for the executive office, so that my father did not have to concern himself with it. He was very efficient in the factory. He handled a lot of external affairs, and was able to make many inventions. In the time between 1906 and 1914 about 30 patents were originated. I have all of the numbers here, I am giving them to you along with everything else, so if you want to check over them you can.

I was born on July 26, 1902 in Vienna. I, Curt Herzstark, am the oldest. There was a younger brother who was born in 1906. From my youth onwards my father concerned himself with me. I respect my paternal grandmother above everyone. She was widowed in 1872 and was the daughter of a doctor. In order to support herself she took on the profession of a midwife. I think, that she did have a university degree. She was a woman who knew life with all of its good and bad sides. I was in her care until her death, until I was nine years old, and I am grateful to this woman for many things. She was a quiet, enlightened woman. I liked her very much. She was wonderful with children. She told me fairy tales. She tried to explain all kinds of things to me, whatever I found interesting. She also had the quality that, if she said "yes", it was "yes" and if she said "no" it was "no", and I couldn't do anything about it. She always explained so well, why she had forbidden something, that I was not unhappy when I was unable to do something that she had forbidden. This grandmother was very necessary for me. My mother and my father were, of course, always at work. The factory was getting better continually; you can see this in view of all the patents. This continued until 1914 when the war began. My father owned his own house by then which also housed the factory. He already had a villa. He also had established assets.

And then the first World War started, and the difficulties began. Unfortunately after the war began, the production of calculating machines was no longer possible. Many of the personnel had to enlist and the factory had to produce military equipment, specifically Schrapnel ignitors. This type of work requires precision. The ignitor is suspended into the thing and then the thing explodes. In any case, it was precise work and we received the assignment.

My father was 48 years old at the time. At first he didn't have to go into the army, but in 1916 he was indeed drafted. My mother tried to get him out of it, and here I would like to say something interesting about anti-semitism: she went to a certain officer Wojnovich who was in charge of the whole affair. She said, "He is almost 50 and we need him in our operation. Is it possible that he could be excused?" To that the officer said, "I do not see why that is necessary. It is fine with me if Jews get to know the war." So, in spite of his age and his work, my father went into the military in 1916. First, he went to Albania. There he worked in an electric unit that was not at the front but in front of the front. They electrified barbed wire there. Then somehow he became sick and he was transferred to a field cinema. It was not as difficult for him there and it was also interesting for him. At any rate he got to know something about the movies. At the company, we produced precision ignitors from the beginning to the end of the war. And Master Hairad was the master in charge of the factory during that time.

In the meantime I was growing up. I was born in 1902 and went to elementary school in 1908. I had the good fortune to have a wonderful teacher for four years, who encouraged my abilities in music. I was very musical and thought for awhile about studying music. Specifically it was like this: we were fairly closely related to the Kreisler family. And we visited the old Dr. Kreisler very frequently. He was the father of Fritz Kreisler, Hugo Kreisler, and Ella Kreisler. Fritz Kreisler was the well-known composer and violin virtuoso. Hugo Kreisler played with the Viennese Philharmonic, a cellist. Ella Kreisler was also a musician, but she was a girl clown above all. After WWI, she led the American Childrens Assistance Workshop that Fritz Kreisler started in America.

I went first to school and then to the Middle School and then High School. In High School, I took Latin and English. As I was finishing up the Lower Middle School, my father said that it did not make sense to finish High School and to waste years studying technology there. Because, what was taught in our field at that time was uninteresting. A typical High School taught something about storm drains at that time but never any fine mechanical work. So, when I was 14 years old I stopped going to High School and went instead to the so-called Higher State School. This was an Engineering school, similar to the one here in Winterthor with a finishing examination. There I studied machine construction. Also, in 1916, when I came out of the Middle School, I spent a year out of school and worked as an apprentice in fine machines and tool construction and was educated as a diemaker and precision mechanic. This was very useful in later projects, because it taught you to think out a project from the beginning, how you can produce something in a reasonable way. So, I completed my apprenticeship, graduated from the state industrial school and was finished in 1921.

The War was not profitable for us. We produced ignitors day and night in our factory and when the war, which we lost, was over and my father came back, all of the construction machines were worn out because of the 24 hour shifts. Aside from this, there was the extreme inflation. We received from the Austrian government a total of 2 million Kronen. This is what was owed us but at the time 14,400 would buy a couple of boxes of cigars. In any case when the war ended, the Herzstark building was all that was left-standing there. The personnel had been decimated, because through the division of the Monarchy many people left and went into Czechoslovakia and to Hungary etc. The equipment was old, worn out, or demolished. My father came back from the war and I was finished with school. My father was very brave and "gutsy" and asked, "What shall we do now?" He used his connections in America

and Holland. He got them involved and imported, I think, 200 used Burroughs machines. These were used but certainly functional machines. In America, the large companies and factories often traded in such machines for more modern ones after 2 or 3 years. So these machines were still quite good. In 1919-20, with these machines he began to build up the business again. He was able to sell these machines in Austria, because at that time, the people, the authorities did not have money for the more expensive new models. And you could sell these machines for 1/3 of the price. But they were very good. The machines were not bad at all. The Americans in the large corporations got rid of their machines after only three or four years.

Aside from this, we had parts in storage for 300 to 400 Herzstark machines from 1914. So we, of course, also assembled these and began to build up the company in this way.

In the mean time I had finished my "Masters" degree ("Gymnasium" -- high school & two years college). I had worked in our factory for about a year and became a little "infected" by the new American ideas. My father subscribed continuously to American engineering journals. There was one called "American Machinist" or something similar, which I liked. And interchangeable part construction and assembly of modern machines was already shown in these. Naturally I was very enthusiastic and I thought to myself, "Oh, we have to establish interchangeable part assembly construction also." In any case, I was in the factory for a year after my graduation and wanted to change everything immediately. Fortunately my father stopped all of this. He said, "It is all very nice and I would like it that way too, but now is not the time. If we did so now, we would perish. We've got to reconstruct things first." "Now", he said, "apart from all of this, you have now been very well educated but you lack experience. I am sending you to Germany, so you can get some experience, specifically to Kennitz."

Right around that time, in 1922, the Astrawerke was established. This was a factory to build a 10 key adding machine like the (American) Dalton system. The inventor's name was Astra and he had worked in America with Dalton. He originally came from Germany. His name was Johnny Grelle (?). He was from Hamburg -- then he was a journeyman in Kennnitz (?) for a short time and then he had started the adding machine business. By 1922 he was successful. He began, I think, with the Darmstadter Bank or with the Kennnitz Common Market. This company produced the Astra; that was a very famous machine there. His kind of machine, a machine with ten keys, was constructed similar to the Dalton, naturally. The machine had one advantage: it had 1, 2, 3 Zero keys. So, when you wanted to write three

marks you did not have to enter zero twice but only once. Otherwise the machine was standard, with its design greatly influenced by Dalton.

In any case, my father sent me to Kennnitz (?), and I worked at the Astra works. Our company was the Astra agent for Austria and the other states that resulted from the break-up of the monarchy. I became familiar with machine constructions there. I was there for about a half-year and took apart and rebuilt 20-30 machines. In the mean time, I began to realize that there were many other interesting subjects there, and specifically the Wonderwerke. The Wonderwerke was a large factory, which manufactured small automobiles, motorcycles, a woodworking machine and an adding machine. At Wonderwerke I succeeded in doing further volunteer work. Specifically, I didn't work in the adding machine sector, but I worked for a short time building wood working machines. And I got to know the tools, the section management and all of these things. So, I became more mature in assembly which was the most interesting for me -- how one produced something. Then after a year in Germany I went back to Vienna and went back to our factory. In Vienna I worked in the factory. I like to say that as a child my grandmother was the most influential person in my life, and later on my father was the most influential person. My father concerned himself with me very much. Our family was very solid. My parents were both business people, they had a very good marriage, thank God. In spite of their differing religions they were free-spirited. They were tolerant. My grandmother on my mother's side was still pious and she still went to the Catholic services. My grandfather on my mother's side was an artisan/carpenter. He came from the Romanian-German border. He was also a rather modern person. My Jewish grandmother was very tolerant of people, because she had the job of mid wife. I grew up in these surroundings. My parents lived very simply, very well; we never had alcohol in the house. We ate simply and on Sunday there was a roast. We always had plenty I think; in spite of everything we were fairly well off. In any case, I had good training and experience in both machine assembly and sales management. I was with my father whenever he sold anything. And as a child I attended exhibitions. My first exhibition... was in 1910. There's a nice picture of that. There was an international office exhibition in Vienna in the so called "Gartenbauheim". The exhibition was opened by the daughter of the well-known Viennese mayor, Karl Lueger. I became acquainted with him. Then came all of the royal dignitaries. I became acquainted with all of them. And I was a miracle child in his father's display booth, and one encouraged the people to give me, an 8 year old boy, five and six place multiplication problems, and I would calculate them on the calculating machine. I would like to stress that I could never have done that on paper, in my head. But, I had been well-taught on the calculating machine. The people gave me two numbers with many places and I put in

one of the numbers. They could see the entry and inspect it. Then I put in the second number of the problem and the result appeared automatically. The people were amazed... the miracle child... the picture still exists, I will give it to you. It often sounds like a novel so that only with proof can I show that I am not making it up. Now lets go back to 1925. I think, then I was about 23 years old and was, in our business area, quite well-prepared. I was an idealist and through my father, infected with intellectual curiosity. I wanted a nice modern factory with quality work even if it was not large. Because of the Master Hairad and my father; we had quality work from the beginning. At that time, we didn't use interchangeable part construction, rather the individual parts for each machine were carefully constructed and assembled. Looking back, our machines ran even after being in use in a factory for 20-30 years. They still run today... there's in Ludwigssburg a gentleman who still calculates on one of these machines. I can show you the pictures.

Then in 1925 my father said, "Now that you have understood everything very well and are very efficient in the factory, I would like you to get to know the export angle. As the future boss you should know how to sell and learn the customers' needs. In any case, it is necessary for us to reorganize the sales structure in the eastern European market because the war was lost. I am putting you in charge of sales in Czechoslovakia and Hungary so that you can start a fresh organizational structure there -- based naturally on a backward glance."

"I want you to start there and show whether or not you are also efficient in sales. And so that you are not too far away from Vienna, let's start in the Brumm (?) area. There is a large German-speaking area which is called Schoenechsgau (?). There are three or four cities there with nothing but textile factories. They were customers for Herzstark machines before the war. Go on down there."

So I did that. I began in the little town of Zwitau (?), a textile city, which is about 200 km from Vienna, and got involved in sales. First, I visited the old customers for our machines, who were there. They were satisfied, thank God. In 10 days I sold machines worth 380,000 Czech Crowns, on the basis of these recommendations. I went on systematically from there and for the whole next year. I was usually out selling for 14 days and then spent 14 days in the factory. Over the course of the year I visited all of Czechoslovakia from Asch to Uschenst (?) so from the Bavarian peak to the Roman peak. There was hardly a savings bank that I did not visit. So, I began to sell machines. We had, of course, a variety of models and we also had the Astra machine.

And now here is again something interesting. The AstraWerke delivered at that time a machine with a keyboard but with a wide carriage. One could type in a list of brands and prices and prepare a list in this fashion. But when the list was finished one had to add up the resultant perpendicular columns separately.

I called on a large hat factory, specifically the largest Austrian and European hat company, Hueckel Brothers -- in Neufitschein. I came to this area in May 1926 as usual. I visited old customers first, who were very satisfied. Everywhere people told me I should go to this Hueckel company. They had just reorganized and there was a young man there studying the use of calculating machines in the business. In six months he would finish his studies, and then the company would probably buy a large number of different machines, maybe 100 or more. So I tried to progress with this Hueckel company. But the young man, this Mr. Holub, that was his name, when he heard that I came from Vienna, said he was not interested. He only bought American machines and wondered "if anything good can come from Vienna?" I was naturally disappointed, but I had many good customers in Neufitschein and I didn't give up. I went to see another satisfied customer, specifically a health insurance company. They also reported that the Hueckel company was reorganizing, and I explained that I had been discouraged there. The customer wanted to look at the machine with me and then telephoned Mr. Holub, and said, "You should look into this." The end result was that I was allowed to see this Mr. Holub. At first he was short with me, but he saw soon that I knew my business and he became more cordial. He had mainly received brochures from other companies and had not been given any real demonstrations. He allowed me to set up some sample machines. Based on this demonstration, the Hueckel company bought over 100 machines from us over the years. Mr. Holub became a good friend, because he saw that we gave him good service, especially maintenance service. That is, of course, very important in such things. If a factory is using certain equipment and some kind of disruption comes; one has to be there quickly. We could do that because we had mechanics -- while with the other companies everything had to come from America. Let's say they chose an American machine but neither they nor the distributor understood it technically as well as we knew our machine.

And now comes the following: in the Hueckel company there was one of these small Astra machines with a wide carriage for calculating the payroll. But, of course, one still had to add the vertical columns separately.

Mr. Holub used the Astra machine for pay scale calculations and for time-studies. Before he had had the Remington bookkeeping machine, also as a demonstration model. He had already removed the counter jacket and could already make vertical and horizontal sums readable, but not automatically calculated. We conducted time-studies and our Astra was about 60% faster than such a bookkeeping machine. The time for vertical addition was still more efficient... than the Remington. Mr. Holub said it would be nice if the machine could do everything, horizontally and vertically. That challenged me and before long I succeeded in inventing something for the Astra machine. The result was the Herzstarkmultimator. Specifically, this was a standard machine that we obtained from the factory and onto which we built a second calculator backwards onto the machine. This carries over exactly the same numbers as the front calculator. And put as many calculators as columns on the carriage, so when the carriage moved, the individual results were stored here completely automatically. And we could push at any time in the same way when all was finished... there were three keys, the total, subtotal and number. At the end of a page you could push the subtotal key and the machine ran through and printed all of the sums, and the subtotal would carry over automatically without having to read off the result. The machine did this, and one could subtotal at the end of each page. And when you pushed the total, the machine cleared itself. That was my first invention.

TOMASH: Mechanical memory.

HERZSTARK: Yes, yes. And this machine entered the World market for the first time in 1928 at the Berlin Office Exhibition at the Radio tower. At that time this... this radio tower, that is still there today had just been erected.

The machine was exhibited and was a great sensation. It was the first thing that I had invented that had value. My father registered this invention with the patent office under his name, because he had had many patents previously as factory owner. I will give you a list of them. In any case, that is the first major thing that I invented. And we made, naturally not very many, about 350-400 of these machines from 1928-1936. For example, we made a model for use by the savings bank for the daily accounts. If someone brought in their passbook, the bank could print in the old balance, the deposit or withdrawal and the new balance with the machine. And when the transaction was finished everything is already totaled. The deposits and withdrawals for the entire day were totaled.

With the Adrehms (?)... maybe you are familiar with the Adrehms (?). One could type up the pay sheet with this

machine; one could print out the worker's net pay. For example, \$35.00 for work and overtime is so much, add on postage, and subtract automatic withdrawals for health care, insurance, net, second, third, fourth and when the transaction was finished it had everything totalled right there, all overtime wages, for example. One could do this very quickly.

TOMASH: Was this printed... on paper?

HERZSTARK: No, not on paper. The printer was separate. We built on a small Adler typewriter, so that you could print. You can have all of the patents but then you would have to be here for days. So, that is my first invention, you can take this with you.

TOMASH: The first invention was the addition of an accumulating mechanical memory unit to the Astra -- Multimator.

HERZSTARK: For example, a chair was set up for fine mechanics at the Vienna Technical University. His name was Professor Karl Holecek. This machine was so interesting to him that he spent days here doing studies on it, and then he wrote an academic paper which also belongs to you now.

HERZSTARK: I have here then... I am getting rid of everything gradually. Here you have a brochure for the CURTA in French. Then you will also in English I have... maybe. Yes. There you have a detailed English brochure. You can see... exhaustive information inside. I did all of that and then translated into German. They are all work of mine.

HERZSTARK: Then here you have... that is also English. And there you have the English instructions for use.

HERZSTARK: This is in Vienna, and there is an article about me and about everything... You can have that too.

TOMASH: Yes, this is an article in... by Professor Erhard Anthes from Ludwigsburg. "The Viennese Engineer Family Herzstark and their Invention calculating machine CURTA." *Blaetter fur Technikgeschichte...*

TOMASH: Oh, this too? I didn't understand that. Herr Herzstark is giving this to me and it's not necessary for us to record this.

HERZSTARK: If you want copy it and send it back I won't be angry either, but please I assume that you are the correct heir and you will value and preserve it correctly.

TOMASH: You would like it returned?

BURGLER: He thinks it's in the right hands now, so he gives it to you.

TOMASH: Very good -- that's wonderful.

HERZSTARK: You got my address from a professor in Cologne, didn't you?

TOMASH: Yes.

HERZSTARK: From him there.

TOMASH: This... when I saw this, is when I wrote...

BURGLER: That is why he wrote. He saw that.

HERZSTARK: Now, we will go... Do you still have more room on the tape, because this is a unique matter.

TAPE 1/SIDE 2

TOMASH: Side 2 of interview with Curt Herzstark. Please continue.

HERZSTARK: Where did I stop now? Where was I? Yes, okay, now we can go again. Between 1926 and 1936, I

personally sold 2,000 Herzstark calculating machines of all varieties for the Herzstark company. Among these there were perhaps 100 to 300 of these Multimotor machines. At the same time I always spent half of each month finishing these Multimotors and developing other models of the Herzstark company. During this time we also made multiplying machines again. Specifically, as follows: in 1937 [1927?] my father signed a manufacturing contract with the Matthias Bauerle Company. This company, Matthias Bauerle, in St. George was well known to my father since 1908. There were three brothers there. It was a watch and clock-making factory and they had a department for calculating machines which were copied from the Thomas system. The youngest brother was called Tobias Bauerle. He ran the calculating machine factory there. They were not very big and only produced 26-30 calculating machines per month. They [my father and Tobias ?] were friends. So after World War I my father signed a contract with the Matthias Bauerle Company, actually with Tobias, in which the Matthias Bauerle Company received modernized electrified prototypes built up with the Herzstark methods. In exchange my father arranged to obtain basic mechanisms from Matthias Bauerle Co. These were constructed with the same Thomas system as ours. This made the production situation a little easier in Vienna, because he did not have the skilled mechanical workers after the war in Vienna. This basic machine was modified to be electric with built-in automatic division in Vienna. I will show you pictures of this machine.

TOMASH: We were in 1926.

HERZSTARK: 1926, yes the...

BURGLER: It was about the Professor...

HERZSTARK: Calculating machines as experiments have been well-known since 1600, but at that time they were practically museum pieces without practical worth. Because someone tried to build something and one could watch, for $2 \times 2 = 4$ it took exactly three times as long as in your head or it was wrong. So they were... they were curiosities. The first real machines with which one could calculate were built by Thomas of Alsace [Thomas de Colmar], specifically, in Paris. In Paris a Professor Reuleaux (that's spelled "Reuleaux") was an operations expert. He got to know and owned a Thomas machine. He gave a contract to the engineer Burckhardt, in Glashütte, to build something like it. And Burckhardt built the first Glashütte calculating machine factory because of this stimulation and support.

He lived in Berlin much later and wrote a "work". Aside from this Burckhardt had a second company by the name of Poltig. They were two small calculating machine factories, they had a monthly production of about 10-15 machines. But at that time, that was mainly a novelty for observatories or such places. Ordinary people did not buy such machines at that time. And my father became acquainted with this machine while he was in Glashütte when he was traveling. He saw that it was something that one could expand, something that had a future. For this reason he became interested in this area. In Europe it was not possible to copy a Burroughs machine. That would have been too complicated. The Americans were far advanced. They also had world-wide patents and especially in the area of calculating machines there were still official restrictions. So my father managed to survive through all of this in 1906-7 because he improved this Burckhardt machine. I can also show you one of these. One could easily build the best machines so that they had interchangeable parts. But this machine has a whole row of disadvantages, that I will show you.

We will find a picture of one of these factories on the back of this advertisement. There, look, this is 1913, look at how that looks. Still in a wooden box, isn't it? And we at Herzstark were already far advanced. And (what) is interesting: if you figure out this example, it is not correct. That was also funny. The wrong calculation on a calculating machine advertisement.

And then we had, secondly an important patent. We already had a machine at that time capable of summing up a series of multiplications. For example, construction foremen have to prepare long cost estimates. That is, many, many multiplications as individual products that have to be added up. We already have such a machine. It had a two counting assemblies. So when one calculated, it appeared in two registers at the same time. You cleared the first machine and continued multiplying, the second added that together so that the cost estimate was already totaled. This model was called "Zwilling" [twice].

TOMASH: Did you have to take a license from Thomas in Paris to make the basic machine?

HERZSTARK: Yes.

BURGLER: ... from Thomas in Paris?

HERZSTARK: No, no... no. A patent is generally good for 15 or 18 years and the Thomas machines was almost unchanged since 1830. And this machine was based on the so-called Leibniz stepping wheel. Besides, patents are only valid for one country. I mean, if one wanted to hold a patent in every country then one would have to have corresponding capital or sales representative to represent them. So, in this case, no license was needed. When my father began, he used the so-called Thomas system, but as modified by Burckhardt. He built a new tripod, a better one and improved the clearing mechanism. One had to clear the old machines by several steps. My father built a machine that one could clear very quickly with one handle. That was... ideal... both clear levers were next to each other.

This was where we drove the competition crazy at shows. For example: one gave three multiplication problems and I calculated them using a stopwatch. We had competition from the Braunschweig or similar types. First, entering the numbers on our machine goes very quickly because it is wide. The Braunschweig keyboard is so small. With a Braunschweig one had to rotate and push back and I had already calculated the second product. We did three calculations. I was finished with the third when he was still on the second one, no? On the Herzstark the hand manipulations were faster, there was no lost time.

TOMASH: The next question is: Do you have an idea of the production level of your father's company? How many machines per year did you make?

HERZSTARK: We had... I can tell you that fairly accurately. We sold approximately 7,000 machines between 1906 and 1914. 7,000.

TOMASH: 7,000? And how much did they cost?

HERZSTARK: The prices varied. Depending on the size and the keyboard, the cheapest machine, the 7x7x14 cost 700 Krone, these were of course gold krone. The most expensive machine, with electric motors and everything... cost 2,500 Krone. The highest turnover we had was in 1913 before the first world war. We made, for the first time slightly more... a couple more than 2,000 machines that year. That was... in 1913.

TOMASH: And that was when a man made 400 Krone a month?

HERZSTARK: Yes, a skilled worker only got 200. 400 per month was a salary for an engineer or an accountant. And besides that they were paid by the hour. They did not have weekly or monthly wages. At that time an hourly wage was 90 Elle or 1 Krone 10. Most people at that time worked 60 hours. And then, our factory was modern, we only worked 55 hours. Saturday afternoon was free. But 10 hours was the norm. Elsewhere the people in Austria worked 11-12 hours in the textile factories.

BURGLER: For an hour you got about a Krone and 10 and you worked by the hour.

HERZSTARK: 4 Austrian Krone were one dollar in 1910.

TOMASH: Your competition was mainly from America, competition for sales?

HERZSTARK: In calculating machines? Not until after the first World War.

HERZSTARK: The Americans did not accomplish anything with four function machines until the first World War. They got everything from Europe mainly. Before that they had made only adding machines, specifically the Burroughs and then the Walls (?). My father represented these firms for two years.

TOMASH: So the competition was after World War I?

HERZSTARK: Yes, yes... after the World War, especially from 1922 on when the Moderal (?), the Marchant and the Friden appeared. These firms were all American with large amounts of capital. They practically overwhelmed the small firms in Europe.

TOMASH: That was in the 1930s. Friden, Marchant, Underwood...

HERZSTARK: It begin in '22. In our field it was the Mongolo (?) -- that was a machine! Did I mention the Friden? The Marchant, that was in Oakland, California.

TOMASH: Friden was also in California.

HERZSTARK: Yes, they are all over there. In Vienna there was a trading company called Steinhardt. They had three sons, a Jewish firm, they all went over to California and worked at Marchant and Mongolo (?)

TOMASH: What did the Herzstark firm do to respond to this American competition?

HERZSTARK: Yes, we had our basic four function machines. This machine, our machine, could automatically multiply and divide. But we did not produce large numbers of machines because we did not have the capital. We also had electric machines of which we produced about 10-12 in a month. Then we had the Astra to sell and then, of course, the Multisummator, which earned relatively well from 1928-36. The Multisummator had no competition. So to sell, you always had to do time studies. To show that the machine replaced 3-5 people and paid for its cost, when we calculate it, just as a car or any other factory machine.

We slowly began to build new capital again and as soon as possible we rejuvenated our factory system. In other words, we bought the most modern machines. In 1936, our company, which was not very large, had approximately only 80-100 manufacturing machines. We also had American machines, two from Brown & Sharp in Connecticut. Then we had Rivetles (?), which are small mechanical machines.

TOMASH: And how many people did you employ?

HERZSTARK: We did not always have very many, usually only 50-60 people. And as I said, we represented other products of course, no? We received Astra machines, which we sold, as individual calculating machines, no? And from the Bauerle firm we received inexpensive machines and only attached the keyboard. We also made them into electrical machines. Our largest profit was in 1936. We had a total profit of about 4 million Schilling. With all the merchandise together that was the best. But that was the Schilling in 1936. A worker earned only OES 1,20, OES 1,50

per hour. Yes, Dolphus was premier and this was shortly before Hitler, no?

TOMASH: Yes. World War II came and so on...

HERZSTARK: The second war... yes, yes. My father had owned, by the way, a movie theater for many years. As my father got older, he became less interested in the factory. He removed some capital from the business and as he knew something about movies, he decided that this would be something nice for his old age. So he bought a movie theater in the Viennese *Prater* -- the big amusement park in Vienna where the ferris wheel is. There was a movie theater there called Kristypolus. We bought it out and renovated it completely.

BURGLER: He bought himself a cinema.

TOMASH: In the Prater park?

BURGLER: Just opposite of the Prater.

HERZSTARK: He did that there for his old age and aside from that, for my younger brother. I have a younger brother but he was only slightly interested or completely uninterested in the factory. He was already like the heir of a rich manufacturer. He liked sports and had already had cars and he was a master marksman. He was the city champion in skeet shooting three times. Are you familiar with skeet shooting?

TOMASH: Sure, skeet shooting...

HERZSTARK: Yes, but he did not have much interest left for the factory. My father, in 1930, bought the cinema. This was before the dollar was devalued. There was a Bank crash in America and the dollar was devalued by 40%... but this was before that. He said that was his great good luck. He had about 110,000 in dollars at that time and he could exchange these for Schillings three months before, but three months later they would have been 40% less. With this capital he bought the Kristypolus. He used money from the factory and he completely remodeled it.

In any case, my father spent most of his time at the movie theater and I was mainly involved in the factory in those last years. My mother stayed in the office and we had the office managers and a Major from the Krakow Monarchy. He was very industrious and honest, he worked for us, and there we had perhaps a dozen subordinates. In Budapest we had someone in sales... I have travelled to Budapest often. I have travelled practically everywhere in the area of the old Austrian monarchy. There is practically nowhere with a savings bank that I am not familiar with. I was there often for months at a time and when there were inquiries I attended to them. I had a big Chrysler. Instead of the back seat there was a frame where the Astra machine was. I left Vienna with a chauffeur and mechanic at 3:00 a.m. in the morning and was in Prague by 7 or 8:00 a.m. From Prague on to Aussieg, and then I went to Budapest and so forth. Then I spent 14 days in the factory. I travelled almost 2 million kilometers by car -- a huge amount at that time. The most was one year I traveled 700,000 kilometers of travel by car. I only had American cars; the European cars were not good at that time. The Americans had very good motors compared to the Austrians which were not good. I had a Chrysler, I had a Buick, then I had a Hudson, which today does not exist anymore. The Hudson went 140; it was faster than the others.

So, let's continue. So in any case, the factory was growing well because of these sales trips everywhere, I naturally knew the market. And again and again, wherever one went, competitors came with wonderful, big machines, which were ever more expensive and electric, but something was missing in the world market. "I would like to have a machine that fits into my pocket and can calculate. I am a building foreman. I am an architect. I am a customs officer. I have to be able to pick something up. I cannot go 10 km to use a calculator in the office. The slide rules are not useful for my purpose. Slide rules cannot add or subtract. And aside from that you can only read three values from the markings on them, not more. For an invoice I have to know exactly." So, I continually found interest in a pocket calculating machine. Of course, the whole world seemed to be interested in solving this problem. The Mongolo (?), the Marchant... everyone tried to build a small machine, but no one had the courage for a new system. So they tried to miniaturize the existing technology, which does not make sense. You can imagine, that one could readily miniaturize a machine just like a watch maker. But what can you do about entering and eading the number? You would have to work it with a pin. A small machine must also be the right proportions for the hand. So, it was clear that the whole world longed for a small machine. That was a fact, and there wasn't one. And I became involved in this naturally.

TOMASH: Was that in 1936.

HERZSTARK: No, earlier. Already in 1926-27 while I was in sales, people said again and again, "Yes, that is nice, but isn't there anything smaller?" This was a time when there was a lot of advertising of the calculating machine.

Everyone who was a technician, carried his slide rule. But for calculating, the equivalent didn't exist. People again and again said, "Does something small like a slide rule exist?" But there was no such thing.

I started to concentrate on possible solutions and at first, naturally, did not get any further. Later, I had an idea that I should look at everything backwards. I thought to myself, I'll pretend that I have already invented everything. What does this kind of machine really have to look like, so that someone could use it? It cannot be a cube, or a ruler; it has to be a cylinder so that it can be held in one hand. And if one can hold it in one hand, then if is miniaturized, you could adjust it with the other hand. And you could work it either sides or top and bottom. You can make the answer appear on top.

In any case I started to design the ideal machine from the outside first before I designed the insides. And I was acquainted with the step by step method that Leibniz had used in his calculator. I built a model using this and everything worked but only forwards, for addition and multiplication. The moment that I wanted to turn it around it did not work because in carrying the tens, the next 10 is backwards. So, in any case, in spite of that I began to make preliminary designs.

HERZSTARK: So, in any case, I had the machine that far by 1937. The way that I had imagined it, how big it could be and how much it could weigh. There had been a lot of development in the light metal industry. I had already studied the light metal industry; in other words, aluminum, magnesium, alloys, all of that. I was rather modern and informed.

TOMASH: Did you build any models in 1937?

HERZSTARK: Yes, I will show you it right now. In 1937, I already had the form as I imagined it had to look. And I knew what it had to accomplish, but I did not have the answer to the problem in subtraction and division. And then

my father died on October 24, 1937, 14 days after his 70th birthday. Immediately afterwards I went to the company Matthias Bauerle to talk to him as the new boss of the Herzstark company. They all knew me, of course. I traveled by train back from St. George (?) in the Black Forest through Bodensee, Bregenz on the way to Vienna. I can remember. I sat in a compartment alone and looked out and thought at that moment, 'Good Grief! One can get the result of a subtraction figuratively by adding the complementary number to it.' This has long been seen with the Burroughs machine which only added. When someone entered in something and it was wrong, one could correct it by adding a number, which when added to the wrong number yielded zeros and hence the unwanted number was out again. Then I thought that works exactly the same way as subtraction registers. So if I enlarge the second step register, the result can be achieved through pure addition... that was that... that is that...

TOMASH: Yes, this is the machine but it shows... it's all in plastic...

HERZSTARK: That is only for demonstration. No one had done this before. Look when I was finished with all of this and showed this to the Masterworkers they laughed and indicates that it was crazy, that will not work. After my father's death, I built a very rough model just to test the calculating principle, no? Not small and anything else but only to show how three of these registers would work to prove that I can add with this machine... and that was this machine here. Just a minute, it's sticking but...

TOMASH: When was this?

HERZSTARK: That was still before Hitler... that was from '37-'38. I built it within a few weeks in Vienna with the goal of proving this. I mean, if you analyzed something you can make it work... I mean, very simply, on purpose...

TOMASH: Of course... the principle.

HERZSTARK: Yes, the principle... then the people could see, yes that works. One can create all four calculating functions with an addition procedure alone.

That was in '37-'38, in between Hitler came, and now there was a completely new situation. My father had died in

October. There was a will from 1913 and my parents each left everything to the other partner so that there could be no dispute. This will was still in existence but my mother did not want to use it. Instead she suggested, "You get the factory and your brother Ernst, will get the cinema and I will receive a pension from each of you." That was '37, '38 and we were both in agreement.

Hitler came on March 10, and this division of property was not yet officially transacted. The first weeks were dreadful. The mob came then, anti-Semites and all terrible things. Anyone could show and tell you about that. In any case, we had the feeling that we would lose everything if we registered the inheritance because we were half-Jewish, no. Legally, my mother still held possession and we received the confirmation from the office as soon as my mother was, of course, widowed.

The inheritances we had all agreed to were never transacted, and I was hired into the factory as an employee. I never became the owner. I was, then, the factory manager and my mother was the owner. My mother also kept the cinema, because one had to prove, for a cinema, that none of the relatives including the great grandmother were Jewish. Insane... So, in any case, everything started to go wrong for us. Before long both the Bauerle and Astrawerk firms said, "We are not delivering anything anymore. I believe we want to be a good model NAZI firm." So there we were, we had no raw materials from Bauerle and no machines from Astra for the multimotor business. But this lasted for only a very short period. We still had repairs and made deliveries from stock and then the first miracle occurred.

Hitler had come in March and we didn't know what to do. In the middle of May, all of the sudden a German Army team came to the factory. Two officers: a general and a colonel, and three gentlemen in civilian clothes came into the office and asked for the owner. My mother came in and they were greatly astonished to see a woman, but after a quarter of an hour they saw that they were dealing with an experienced businesswoman. They were at a loss since we were part Jewish, but asked anyway to see the factory manager. Then I was called. I went to these gentlemen with very mixed feelings. The gentlemen were quiet and cool and began to speak to me, but after ten minutes I felt, they see, that I know something. Later I found out that one gentleman was General Ruedgearme (?) from the army, Berlin office, the other was Colonel Sohm (?) and the three gentlemen were from Zeiss, from Gurtz and the other was named Erdemann. The civilians were there as experts in their fields. So, they talked with me and then we continued in the factory, they looked at all of the machines. They looked at everything. They said, "Good, good, good," and then

they came upstairs again and then they said, "So, Herzstark, this is friendly. We are travelling now under contract with the army from Bregenz to Vienna and are looking at all of the precision mechanical factories in order to determine who is the best equipped to make precision items of the army. We have contracted out some of the work but we haven't contracted out special gauges and calibration tools. We are under the impression that perhaps you could do this." They showed me drawings, tolerance gauges, two millimeter slit with 1/15,000 precision... no? I looked at this, and I said, "Yes, I believe I could make this but not the way it is on the drawings. That is the kind of thing that one does in steps; we have done that for a long time in the firm." They looked at each other, conferred privately, and then they said, "We will give you one month's time, make a half dozen model gauges." I did that and I sent them to Berlin. I received a message accepting them from the gentlemen from the weaponry office (they were not NAZI): I built precision gauges until approximately '43. Naturally you can imagine that for certain people it was irritating that these people of Jewish descent still existed and that they were found with scientists. I became acquainted with Professor Bernt (?) from Dresden. I have citations, I'll show you his work. He corresponded with me up until now. I too was suddenly someone in the field of measuring instruments, and I produced them. And then the war came. Then suddenly these firms were put under the supervision of the technical universities. This was practically a means of protection of the technical universities. In any case... then I became acquainted with Professor Holecek and these other people. They all learned all of these things from me first, no? They were great theoreticians, of the integral and differential calculus and I do not need all of that... But of Professor Holecek, please, with all respect, he recognized that I understood this and knuckled down and was later so intrigued that he taught about it for about ten years in Vienna at the Technical University in the chair of fine mechanics: the machine as an instructional subject. Then in Berlin...

This professor, the tall one on the left... this page (side)... he had the fine work of the Hegelte exchange school, that was the Technical University for fine mechanics. But, I mean, if... time... I can show you a dozen books, where Herzstark is in there everywhere.

Now comes... the CURTA comes in for the first time, no? I knew how in principle to build a machine for the hand in 1938. Naturally the moment that Hitler came all of this was put aside. First, we were not allowed to build any more calculating machines. Secondly, I said to myself, this is a living for me perhaps if I emigrate or something. Aside from that we were fully occupied building measuring instruments. I had tried out various small things in the model

that I showed you. In Bakelite, to see how it would work, no? There are a few different models. You can imagine how much work that is by the time you have everything. But I put that aside and we built measuring instruments until the year 1943.

We started with Hitler in '38 and I was arrested in '43. So, until '43 I made a large variety of measuring instruments and distance gauges. Something else interesting: they had a problem with some PANZER plates that had to be very precise in the middle instead of from one hole to the other. How did they measure that? They had to calibrate. They measured that in between with something. You can imagine, how long that takes. That took place in the middle of Darmstadt. The following idea occurred to me: if one puts a ball on a hole, the center always stays there even if the hole is somewhat larger or smaller. So if I made a measuring instrument, where two balls go into the holes, then you could measure that quickly. So I built an instrument... I also had a patent, you could go over the hole as if ironing... putting in on top like so and a measuring gauge showed in a second what the gap in the middle is compared to twenty times the time, he had to first... because every drilling had a little tolerance, but that had to fit tightly.

TOMASH: Until 1943, he built things for the Wehrmacht, precision instruments of some kind. What sort of things did he build for the Wehrmacht; were they instruments or tools?

BURGLER: Right, instruments or, oh... it's very difficult to say. They need it for tanks, for example, you know, just some special guages.

HERZSTARK: I can show you...

BURGLER: He can show you what he had to build for them.

TOMASH: Is this '43?

HERZSTARK: I was still actively busy with manufacturing guages and I received a whole series of patents, also for a ...

TOMASH: Were you in business on contract to the Wehrmacht?

HERZSTARK: I was an employee. I was there as an engineer, my mother was the owner and I was employed there. And... workers...

TOMASH: And the Germans did not put in a manager?

HERZSTARK: No, I dealt with the Army. The army, the officers, they were Prussian but not Nazis. I did not have any enemies at all in the company. Our people were very well qualified people and they were social democrats, they were not Nazis. They naturally had to also be legal... but I had no difficulties in the company. Trouble only came from outside.

But in '43 two people from our factory were arrested and one was decapitated. They had listened to English radio stations and transcribed the broadcasts on a typewriter and passed it on. This was discovered because of the typed copy. The typewriter was identified and the owner, he was one of our mechanics, his name was Zur, he was beheaded. The second one was called Britner who was imprisoned for life, which was much worse than. I tried to intervene for the two of them with the Gestapo. He threw me out and said, that is impudence, that a half-Jew dares to speak on the behalf of these people. Eight days later I was invited to a testimony for these people and arrested -- nice, no? And then my house was searched. Suddenly, after weeks, I received a warrant of arrest for protective custody; then I was held in a Jewish cell. I had, of course, never had a trial. Specifically, I was accused of supporting Jews, aggravation (?), and having an erotic relationship with an Aryan woman. They had postcards and letters and said it is impudent that a half-Jew is acquainted with an Aryan girl.

So, those were my three crimes, that were really absolutely nothing, it was all fabricated. Later, I determined from a dozen other technical people in Buchenwald that they were arrested like this or under similar circumstances. The goal was to get technical people and to use them as a work force. With us in Buchenwald there was a Frenchman, who was a skilled, famous technician. He lived in Paris, his family was in Alsace. Everyday during lunch he ate in the canteen. I think he said in the Gar de l'est -- that is a train station in Paris. And one time he sat down there and a German "military helper" and asked if she could sit down. He said, "Of course." All of a sudden she bellowed, "Pig! Police, he grabbed me underneath my skirt," and a policeman was there immediately. It was a set-up and he was arrested and was sent to Buchenwald. I came to Buchenwald and became acquainted there with Ministers of Foreign

Affairs and all kinds of other quality people. I am, as you know, an honorary citizen in Luxembourg, because I... saved the life of a Luxembourg man.

To continue... that would take a terribly long time now... I travelled the path of suffering from Vienna to Linz to Budapest to Prague. I was sent to Pankraz prison, then on to Eger and then I was sent to Buchenwald. There, in the very first weeks, I was put in a work unit where I believed I would be buried. That was in November and all I had was only a prisoner's outfit, a shirt, a pair of prisoner's pants, wooden shoes and a knitted cap in November. And so I worked in gardening, and I was completely exhausted. I will also show you a couple of illustrations from Buchenwald...

BURGLER: On the way to Buchenwald, were you in other cities? Or did you go directly to Buchenwald?

HERZSTARK: We went directly to Buchenwald, only it was, I think, 14 days before we got to Buchenwald. I was in the prison in Linz overnight. That was a small room like this one here, where maybe 20 people were lying on the ground. Absolutely nothing... no changing room, absolutely nothing. Then we continued traveling. We have stood with the vermin. Then we went to Prague. Then we were in the prison in Pankraz. There I became acquainted with the SS for the first time. I have to tell you about that. So, I was delivered to a cell there which was not as big as this room. There were fifty of us in the cell there, and without anything at all, no beds, nothing, no lavatory... there was kind of a sink but otherwise nothing, no nothing. There was where we slept. On the next day in the morning was the following: first there were the Czech prisoners. They... and doubled... there is... immediately with... so, and then... wrestled again gave him the whip and began to whip all of the people. Now, we did not know why and then we had done...

[This last part of tape 1 is very poorly recorded.]

TAPE 2/SIDE 1

TOMASH: Number one, the interview with Curt Herzstark continues. It's working now.

BURGLER: Ah, its running now.

HERZSTARK: It would be too much [and range too far] if I were to tell you all of the details, then I would have to relive the hours until I came to Buchenwald. So, in any case, how I was delivered in Bochum is a really terrible story. I was already spiritually at zero [seelisch am Nullpunkt], and then I came to this so called "small camp". I can show pictures of it. And I thought there, I have to die and in the moment, where I was completely broken. I was called onto the field [Feldplatz] and into the commanding office. An SS officer was sitting there. He had my life history in his hand and said, "You have delivered gauges and instruments to the Army. Listen closely. If you follow our commands obediently you will find life bearable in the camp. I am giving you orders to go in our Gustloff-Werk. This is a fine mechanics factory which is connected with Buchenwald and if you do well there, then you will progress and be able to live. And I was brought to the Gutloff-Werk specifically to the work preparation department [Arbeitsvorbereitung]. And there, interestingly enough, Engineer Munich was in charge. He knew my gauges very well. I saw more than a hundred of these Herzstark gauges in the Gustloff-Werk. And the engineer said, "Listen, Herzstark, there is no policing here. You have to take care of yourself, because the sun will shine again one day for you, too. I will give you various projects that you can do for me. You will receive a special permit. You are to go through all of the rooms and look at all of the production machines. Check to see what is being produced with each machine and report to the production scheduling department, whether or not the machines are being used correctly and to full capacity. This means whether an expensive part is being made on a more expensive machine than it requires for the job."

So, I received this special permit and wandered through the halls of the Gustloff-Werk to the great surprise of the many other prisoners, who thought at first, that I was an informer. They found out soon that I was not a spy. For example, I stood by a machine and started to talk to the operator, "Yes, you are making this part well my friend. You are very industrious but you can't do anything about it if you are told to do a simple milling process on this expensive milling machine when an inexpensive machine could be used. So I will report that the machine is not being used efficiently, the prisoner is doing model work but the organization is not good." And so I made such reports. I became acquainted with Luxembourge, Frenchmen, Danes and people from many other places because I was always walking through the whole factory.

Naturally, comrades came to me and said, "Curt, you have a certain influence. Can't you bring this or that prisoner

into the factory? He will die otherwise." "Yes, if it is possible, I will do it. I will report it. What kind of profession does this man have?" "Lawyer." "Yes, what should I do with a lawyer?" "Well maybe you can find a way for him, comrade." So, when I informed the production scheduling department that I have ascertained with my inspections that a number of parts are getting into the camp without any inspection at all. And that there was the danger that these parts get to Pennemunde. I suggested that we set up some intermediate inspection "stations" in the halls of the factory. My plan was approved. So I set up a table in the furthest corner of one of the large store rooms. I sat the lawyer down and gave him a micrometer and a few other measuring instruments. Thus, he was taken care of.

The SS guards checked our operations just as a matter of form. Inside the factory there were mostly prisoners, if there was really an inspection, there was a sudden "concert" of coughing. Then the lawyer knew, danger was coming. If one walked by him he was most industrious, with a manner that showed he was not conscious that the SS man was looking to see if work was going on. So I had a whole row, four or five people, who I brought in in this way. But I started to get anxious because the "comrades" always wanted more from me. I knew, if this came out I would be under the cold ground the next day. But fate helped me again.

This was just at the time when the Germans were retreating from Italy, and as they retreated the Germans took the production machines that were any good (insofar as they were worth anything) out of the Italian factories and brought them to Germany. One day in Buchenwald we received two trucks with first class machines from the Olivetti firm in Ivria. I was assigned the job of unloading these machines with twenty people. I was to determine the machine's condition and, if necessary, to repair them. Perhaps to make two good machines out of three that were alike. So, I had to make the machines operational, ready-to-sell. I was happy to be away from the inspection and dedicated myself to this job with eagerness.

When the machines were finally ready, another surprise came. The machines were offered for sale to local Thuringian factory owners. I received the job, like a manufacturer's representative, when the factory owners came, to tell them about the features of each machine like a salesman. I was, of course, then well-shaven; I had a mission jacket and had a Dasque hat on, and naturally as a prisoner had to wear my numbers. I praised the machines when the people were there, like a salesman. An SS officer, or whoever it was, I don't remember, gave the price. I did not know that. I only described the machines.

The second time the factory owners came the following took place: I was called on again and eight to ten factory owners were there. I praised the machines as before. There was one person who kept looking at me and I thought, 'You know this man.' And by the third or fourth lathe it happened that he walked by me, in front and in back of me and he said to me, "Herzstark?" I said, "Yes, Herzstark." He said, "Walther." He was the arms manufacturer, Walther, who made the Walther pistols and Walther calculating machines. He recognized me and he laid a package of cigarettes on the lathe for me. Then I thought, now it is all over, as that was very strictly forbidden, no? But my guard, Hinkel, who had been with me for days, in other words, not the officer, he saw it and did not want to see it. I was allowed to put the cigarettes in my pocket.

Oh there were some who were not so bad. If an older SS was there, he often said to me, "Ha, what's new? What kinds of machines will we look at today?" So, one got to know all kinds of people. The young SS were the most dangerous. I mean, these young ones, they really had inferiority complexes, and a fear that somehow they would be humiliated. If they found an opportunity that appealed to them, they could be very cruel. If a prisoner annoyed them, he can shoot him, because it was [was necessary], wasn't it? So, that could be its own chapter [if we talked about all of that.

So, I [did] this job for a time and then, in between, the camp was bombed. That was the 18th of August '44. Buchenwald [literally forest of beeches] lies north of Weimar. Weimar is city known to everyone. North of Weimar there's a mountain, it's called Ethosberg (?). In the middle of this hill there is a large cleared area where the Buchenwald factory and the camp were located. [Of] Weimar one could not see anything at all from the camp. From airplanes, I am sure [one could see Buchenwald]. At lunchtime we always had to leave the factory and go outside. There was a small little forest, with wormwood [Wurmkreuz] and stayed in there for a half hour while the civilians ate in the factory. And we always saw the American planes on their way to bomb something somewhere. It was wonderful to see these silver bird and not one defending German aircraft. They flew by and then all of a sudden [we] saw the so called "Christmas tree"... it came down smoking and floating in the air. Afterwards the bombs came, one saw the flashes and one counted eight, nine, ten. One could calculate the distance away with [a factor of] 333 meter. But one day, I think it was August 18th, they began to make a "Christmas tree" where we were. Now, we knew, this was coming to us and were terribly afraid. I was in this small forest. I hid my nose in the moss and covered my ears.

It started the next moment, banging and roaring... it was not very long and then it was over. When I put my head up everything was smoky, I could barely breathe. Here or there one heard a scream. Someone must have been hit. Then a friend next to me said, "You are lying in a bad place. Come over here." But I had no time, the bombing started again. When it stopped, I looked over for him, and saw he had been struck by a bomb in his back. If I had gone over, I, too, might have been dead.

There were several hundred prisoners who were hurt that day, terrible when one sees such a thing. Of course we saw equally terrible things when we had daily assemblies in the camp. We had to watch prisoners being pushed in the field. I was never in prison before in my life and I had to watch when they hung someone. Terrible. Because they didn't hang people in the modern way, where the backbone [Wirkelsaule] is actually broken by the fall and they die quickly. They hung people so they died slowly, actually a really wretched death. We had to watch him until he finally died.

So, the factory was bombed and half of the factory burned, no? Then I received yet another job. First, for about a day, we could not go [to the factory] because it was still in the flames. Then I received the job of seeing which machines were still usable. I began to do that and suddenly I received a new job. I was taken out of the camp, to Bilrotaw (?), a works 600 meters under the earth. This Kaliberg underground works had already been in operation for two years. This factory was made of concrete and was used to produce bombs for the V1 and V2. This assignment probably saved my life. I had already had two or three TB infections. Underground, the air was wonderful, this salt air and 600 meters under the earth, 21 degrees C, the warmth of the earth, because it was so far down. That was a medicine for me. I lived underground there in February and March and the year, when was the last year? '45, no? until the beginning of April.

Then I came out and was sent back to the Buchenwald camp on foot for two days with approximately 40-50 other prisoners. We were not guarded by SS, rather by old men, militia, or whatever they were called. But they were more dangerous than the SS, but not because they were bad, rather because they were afraid of us. There were about 40 of us who marched and there were six guards with dogs and old weapons. There were three or four among us with feet in such bad condition that they could no longer continue to walk. They could not go on. The guards very smoothly shot them, no? And then, again and again, if one slowed down a little bit the guards would threaten to "shoot you".

You were afraid because they were afraid themselves.

But, that is how we proceeded until we came to Buchenwald. I believe it was the 8th or 9th of April. The camp had already been cleared out for several days. The SS guards had marched a thousand prisoners down the road, the same one that we marched up. We called to each other as we passed. They said, "We don't know, where we are going." Of those who were sent away, many died miserable deaths. They were jammed into freight cars where one might normally fit 40 people. [They] penned in 80 people in each car and did not open up [the cars] for three days. They were shipped to Bavaria. So, I found myself returned to my prison block in the camp on April 8th. I was alone; the SS had already gone, no? I had only received one small bread portion.

And then, I think, on the 9th or 10th, it was exactly at 9:00 in the morning, I heard a terrible racket. When I came out, there were five, six soldiers in one hole. One could almost see the men's heads. They fired and fired and fired, yes, what were they shooting at? It lasted for several minutes and above this group a group of airplanes that circled overhead. Then suddenly it was over. In a half-hour or three-quarters of an hour I went outside and suddenly jeeps appeared from the north. One person sat in front on the car and chewed gum loudly. What is going on? And he came to me and said, "Hello boy, come here." Then he spoke German. He said, "You are all free." They were the Americans who freed us. They were Jewish boys, who had fled six or seven years ago when Hitler came to power. They had grown up in the mean time. They were assigned to the forward area because they could speak German. Then I got a pack of "Lucky Strikes" from him. I was told right away where I could get food and clothing. In other words everything was suddenly different, no? It was incomprehensible for the first few days. People went insane then; people could not believe it. I was relatively still nourished because I had been a privileged prisoner. For example, I had permission for my mother to send me a package every 14 days with bread and other things like some sugar and that helped me. If one only ate the food from the camp, the unchanging [diet] was extremely bad. There were people whose teeth fell out because of the one-sided nutrition. And then they starved. You probably have seen pictures; that is really unbelievable. I mean, God and my profession helped me. If I had been, let's say, a lawyer or something I would have died miserably. They would have sent me to a quarry, with only those clothes. In two days I would have a lung infection and it is all over. A thousand died like this. They died because of chilling and undernourishment. But, I could talk for hours about that.

Now I had just been freed, no? So then in the next day or two the first sensation came. The U.S. Army officer in charge of the camp chased the resident Weimar population up to Buchenwald. They came frightened and crying because they believed they would be killed. He required everyone to come -- women, children, everyone. He brought them to the main camp prison yard and to the crematorium where hundreds of bodies were still lying waiting to be burned. He said, "See what German culture has become. From the ideas of insane poets and thinkers you all become murderers. Now get out with your filth"... drove them out. It didn't seem to bother some of them at all, no? They declared, they didn't know anything...

In any case, after one or two days I began to wonder whether I could go back to Austria. They said, "That could take months, but first you must get your health back. Don't go until you get food and everything that you need." I was curious, so I went down to Weimar, no? This was approximately 8 kilometers distant. I immediately noticed that I was treated like some kind of a god. Suddenly, whenever I met people on the path, they would move out of the way to let me pass, because they could still see that I was from Buchenwald. I found this was very embarrassing for me, no? Here and there someone tried to speak to me, "Excuse us, we haven't known anything for years." "Peace be with you!" I replied, "Thank god, I am alive, you are alive. I am not a judge. Others should take care of that."

In Weimar, I thought I should look for our old Herzstark representative, Kurt Mueller, that is, if he is still alive and in business. I looked for this Kurt Mueller business at his old address. I found the two houses lying with the wood smashed into pieces, and there were two boards across the door. I went up and rang and rang the doorbell. Finally an old woman came out. She was terrified when she saw me. I said again, "Peace be with you. Don't be afraid; I am only a former business colleague of Mr. Muller. Is he still alive? I want to see him." She looked at me mistrustfully and then Kurt Mueller came out, no! And again came the fuss over Buchenwald and what had happened and not knowing anything. Again I said, "Forget it, everything is all right. Past is past, we don't want to talk about that for long. How are you?"

And then I spoke to him, specifically about my new small machine. While I was imprisoned inside [Buchenwald] I had, after a few days, told the [people] in the work production scheduling department of my ideas. The head of the department, Mr. Munich said, "See, Herzstark, I understand you've been working on a new thing, a small calculating machine. Do you know, I can give you a tip. We will allow you to make and draw everything. If it is really worth

something, then we will give it to the *Fuhrer* as a present after we win the war. Then, surely, you will be made an Aryan." For me, that was the first time I thought to myself, my God, if you do this, you can extend your life. And then and there I started to draw the CURTA, the way I had imagined it.

TOMASH: And that's how you started to design the CURTA?

HERZSTARK: Yes, these are the drawings, size 1, size 2, everything is there, no?

TOMASH: They let you do that, while you was there in the prison camp?

HERZSTARK: Yes, yes.

TOMASH: We have to stop now, at least for awhile. My wife is waiting to join us for dinner and the restaurant closes at 9:00 p.m. So, perhaps you can come with us and get something to eat.

HERZSTARK: Yes, yes! Good, good.

TOMASH: We can begin again tomorrow

DATE: 11 September 1987

TOMASH: This is September 11, 1987 at 9:00 a.m. in Nendeln, continuing the interview with Herr Herzstark. I did not understand very well, why the people in the factory at Buchenwald allowed you to make your calculator, to do your own work. Would you like to explain that once more, please?

HERZSTARK: Yes [certainly], yes, yes.

HERZSTARK: When I was assigned in Buchenwald to the Gustloffwerk in the "production control and scheduling department" I was surprised to find that they knew my technical background very well. They knew of my inventions

and of my father's inventions. They knew of the measuring instrument and gauge work that I had done for the German army. They said to me there, you will find life in the camp bearable and be protected from harm by the Gustloffwerk, in direct proportion to the way that you work to your full potential. They also told me that they knew I was working on a new invention, a small calculating machine. I was surprised at the depth of knowledge of these people. This was information that they only could have gotten from Vienna. Because in Vienna I had discussed the design problems involved with people from the Technical University so that the people in Vienna were more or less oriented to what I was working on.

The Gustloffwerk people made the following proposition to me. We will allow you, even encourage you, to continue working on your invention. However, you can do so only on your own free time. On Sunday, you can make drawings of this construction. When that is finished we will make a model. And when the whole thing is finished and if it is well done, so that it really functions, then we will give it to the Fuhrer as a present after we win the war. He will certainly make you an Aryan so that you can live in peace and as a German.

How honest that was, I am not sure. But for me, at that time, it was naturally a "saving anchor". I said to myself, as long as I draw and work on this machine, I will be allowed to live in the camp. So I worked on the CURTA invention on Sunday morning in the factory and in the evenings often for more than an hour after lights-out, when the others were already sleeping. I worked in the workroom and also where we ate with the permission of the production scheduling officials of the Gustleffwerk. And so the CURTA machine was drawn up in pencil but completely with dimensions and tolerances. The drawings were finished, luckily, exactly when the war was over.

TOMASH: This recording is being made on Friday morning, September 11. It's a continuation of the recording started yesterday in Nandeln, Liechtenstein with Mr. Curt Herzstark.

HERZSTARK: After I was freed by the Americans, a few days later, I went to Weimar to look at the city. While I was in the city, I took the opportunity to visit the office machine dealer, Kurt Mueller, who knew me from before and had worked with me on the Astra. We started talking about my new invention. When Mr. Mueller looked at my drawings, he was amazed. He said, "That is a wonderful solution. You know, of course, Mr. Herzstark, that we have wanted a small machine to sell on the world market for 20 years. But no-one had an answer. And from as much as I

can tell from these drawings, your approach looks like it might be successful." Mr. Mueller told me that a company I knew, Rheinmettalwerk, was still operating. This was a company located 20 kilometers from Weimar in Sommertal. It was a large factory for typewriters and calculating machines that had been in business for years. A part of the old management that had done business with us in Austria was still there. Mr. Mueller asked if he could let them know that I was in Weimar with him so that these gentlemen could come and give their expert assessment of my drawings? I agreed and several days later, five gentlemen came from Sommertal including the Director of sales, Mr. Weisserth, whom I had known since 1928, because he concluded a license agreement with my father in Vienna in my presence.

Specifically, the keyboard which Rheinmetallwerk was then using infringed on an Austrian Patent which belonged to my father. To return to the meeting, in addition to Mr. Weisserth, there was in attendance the patents engineer from Rheinmetall, Engineer Ge yling. He saw immediately from the drawings that I had the solution. And then there were two more gentlemen from Rheinmetall, who were factory engineers. Everyone was convinced that I had the answer and they asked if I would like to make some kind of a contract with Rheinmetall. At the same time, they also made a formal request to the government for permission for me to work at Rheinmetall. This was forthcoming; I was immediately named a Director at Rheinmetallwerke. Written contracts were not drawn up at that time because it was not certain who had the authority to sign them. The contracts were drawn up for the first time when the Russians were already there. So I began to produce three prototypes at Rheinmetall made from my drawings. I still have one prototype, the other two were at the Contina works and they were somehow lost there.

TOMASH: Did you need to modify the drawings very much when you started to build the prototypes?

HERZSTARK: No, the drawings were really quite complete and the prototypes worked well. I made a few detailed improvements, but everything was, in principle already in the three machines, which was later, also in the production in Liechtenstein.

TOMASH: Yesterday, you showed me a model made out of Bakelite...

HERZSTARK: Yes...

TOMASH: Was that one also made in Rheinmetall?

HERZSTARK: No, no, that was before; that was made in Vienna.

TOMASH: So, you made two models in Vienna... four models?

HERZSTARK: This model of the machine was made in Alt Bruestenburg (?) in 1937-38 for the sole purpose of proving this... that the machine could calculate by addition.

TOMASH: This model did not have a complement for subtraction and division.

HERZSTARK: Yes, the model did have the complement. That was the point of it. That was the important thing, no one believed that one could obtain the correct result with complement wheels through addition steps, no? And so I built this machine quickly, and as cheaply as possible to show that the principle works.

TOMASH: And you are going to give these machines to museums?

HERZSTARK: Probably, to Munich or Vienna. Yes... I only have the one. And this model had only that purpose, no? I was not trying to show the actual approach. On the contrary, I did not want anyone to know, how I really planned to make it.

TOMASH: The three models from Rheinmetall were actual prototypes of the production machines. The earlier models were to show principle... I understand.

Mr. Herzstark has shown me two models, one made of Bakelite and one made of metal, which were research prototypes built before 1937 in Vienna when he was developing the principle. After the war, when he came from Buchenwald with his drawings, which were very detailed, Rheinmetall helped him build three prototypes. And how long did it take to make the prototypes?

HERZSTARK: The people who did the actual construction at Rheinmetall understood everything right away because my drawings were quite clear. Everything was already calculated with tolerances and dimensions, and they were able to produce three models for me within eight weeks. The people said it was like scales falling from their eyes. The solution was clear and there was not anything more to think about.

These three models were happily completed, just as I was getting ready to leave Sommertal for Vienna. I took these machines completely apart into little pieces and put them in a small box. If someone had looked in there, it was like a toy... the whole thing was disassembled. And luckily I was able to save all of the parts all the way to Vienna. Then, in Vienna we reassembled the machines. So I had the three complete machines assembled in Vienna, when I came to Liechtenstein. That was the spring of 1946. At that time, I registered continuing patents. The first patent applications had expired the year before, since we had first applied in 1939 and '38. In Vienna, I registered a whole series of patents before I went to Liechtenstein.

TOMASH: From Weimar... from Rheinmetall... You went to Vienna or to Prague?

HERZSTARK: I fled from Weimar because I was afraid that the Russians would send me to the Soviet Union. I had heard reports about people who were known to me from Zeiss, that they were arrested and deported to Russia. It was rumored everywhere that the Russians would claim that the technicians were Nazis. Then they would arrest them and ship them to the Soviet Union. Often the accusation was not true, rather the Russians were eager to bring industrial engineers to the Soviet Union, so that they could give information to the Russians. I was, of course, afraid of the Russians and fled with these prototypes from Weimar. With good friends, who helped me, otherwise that would not have been possible, I left Weimar with other people who wanted to go back to Austria. We went over Kennedy (?), then over the Eizgebrige (?) to Betenland (?) and went to Prague. In Prague I was given a place to sleep in an empty hall in the provisional Austrian Legation and slept on the floor for one night. The next day I did not know what I should do. There was a kind of Czechoslovakian welfare office in Prague and I told a woman there about my situation. I gave her a number of Czech names of prisoners, whom I knew from Buchenwald. Among these was the name of a former Czech prisoner, who I learned was now Vice Mayor of Prague. They made contact with him and brought me to this man. He arranged for me to bathe and shave and he gave me Czechoslovakian money. He said, "We can bring you as far as the Austrian border with all of your possessions. We can only go as far as that. You

will have to see for yourself how you will get to Vienna from the border."

I left Prague on a perfectly ordinary passenger train and traveled via Tobor (?) and whatever the names of the cities were to Tschessgevenitsche (?) to Deutsch general (?). I sat in a compartment, the conductor had been alerted in Prague that he should take care of me. that I was a former prisoner and should enjoy every protection. I sat among Czechoslovakian people who tried to talk to me. They used their knowledge of German to help and asked me many questions and treated me very well. And so I came as far as Tschessgevenitsche which was at the border and was the end of the line. I got off the train with my little suitcase, which contained the parts for these machines, and thought about what I should do next. I decided, 'You must cross the Czechoslovakian border to Austria. And I simply walked over the border there with my little suitcase. It was not difficult. There was no real customs inspection and thus I came to the city Gmund. There I thought again about what I should do. I had learned at the train station that the Austrian trains were not running. I decided to go to the Savings bank in Gmund. I remembered that the bank had four or five Herzstark machines in use. Unfortunately, I found the savings bank was closed up and now I was without any ideas again. Then it occurred to me, as something happily often did, that there was a large coal dealer in Gmund by the name of Warnitz Berger (?), who had bought machines from us. I actually went to his house but when I was still 100 meters away I saw that five or six half-drunk Russian soldiers were sitting on benches by the entrance with [some] girls. Naturally, I turned away, because I had no idea how these young men would react to me. I went around the house in a wide circle and met a farmer's wife and asked her if Mr. Warnitz Berger was still alive. "Oh yes," she said, "He is alive. But he is living in the barn. The Russians confiscated his apartment and he is living in the barn with a few pieces of furniture." The farmer's wife led me to the barn to see Mr. Warnitz Berger. He was delighted to see me and after the usual crying and comforting he asked me, "How will you get to Vienna?" "Well," I said, "That is something that you could perhaps tell me. After all you are at home here. I really must get to my mother's house." "Well," he said, "There isn't any normal train travel yet I have an idea. Tell me, do you by any chance have some presents, such as cigarettes, chocolate or dollars or something?" "Yes," I replied, "I still have some things like that." He said, "Then I can do something. Every week a train comes from the mines in Czechoslovakia with a shipment of coal for the Russian garrison in Vienna. It stops here in Gmund where the Czechoslovakian personnel are replaced by Austrian personnel, who go to Vienna with the train. I know them all because I deal with them a lot because I am a coal dealer. If I talk to them and we give them something, they will somehow take you to Vienna with the train."

And he actually made a deal with some of the people along those lines. When the coal train came, they hid me along with my suitcase in a car. I paid my fare in the form of cigarettes and such and traveled with this train, this coal train to Vienna. It took about five, six hours. I arrived in Vienna with my suitcase in the North train station, in the middle of the night. Vienna was completely without lights but there was a full moon so I could see very well. I went from the North train station which is by the Prater to the factory/house of my mother. That is about 12 kilometers that I walked in the moonlight with my suitcase. The Lord God protected me. I could have met a Russian patrol or something but I succeeded in coming to the factory without incident.

I gave signals by the back entrance. At first no one opened the door. I bellowed again and again and named my name. Finally the caretaker, who was near the door, understood me and then said, "Mr. Curt, a miracle! You are still alive!" and let me in. "Do you know, we never open the door at night. The drunken hordes come and if we open the door we do not know what will happen to us." I was brought to my mother and seeing each other again was most heart-warming. Everyone was amazed that I was still alive.

TOMASH: Did you find your brother in Vienna too?

HERZSTARK: Yes, yes. After several days of heartfelt conversation, we came back to reality. That means, I became interested in what was going to happen with me and in what had happened in Vienna. I had some unpleasant surprises. When I was imprisoned in '43, my brother had taken over the management of the company from my mother and continued to operate it. My brother was actually not very knowledgeable, but the old Master Foreman was still there as were the people who supported him. In any case he was then, *pro forma*, my successor.

TOMASH: Had they continued to make the same units for the Wehrmacht after you were arrested?

HERZSTARK: Until the end of the war the Herzstark firm make precision parts for the German army [Wehrmacht]. When I was arrested, my brother took charge nominally. In reality the Master Foreman, Schweiger (?) was his name, understood the work well and so it went until the end of the war. And when the war was over, they had the good luck. They told the occupation authorities that one owner was a concentration camp victim in Buchenwald. Also, my brother's wife knew Czech and some Russian and could talk to them. Then the zone became French. The factory was

not dismantled, rather it remained standing. When I came to Vienna, the factory was mostly intact.

I had the parts of the three calculating machines re-assembled and the three machines operated perfectly in Vienna. But soon I saw in Vienna that I would have family problems. My mother said, "Your brother, Ernst, who had the cinema before, he does not have a cinema anymore. I have given him work in the firm. You should somehow share your invention with him. Why not set up a partnership?" And I said, "That is out of the question for me. I have there my life's work. Now because he does not have a cinema anymore and I had the bad luck to have been in Buchenwald, I should let him participate in my invention? That is out of the question." In the mean time, I went to offices in the Australian Trade Ministry and tried to find out if it was possible to get any financial assistance to start the firm up again to pursue my new invention. They were very discouraging there and said that they had many other problems of higher priority. I soon saw that production in Vienna would only be possible with great difficulty and almost without prospects. I decided then to emigrate.

TOMASH: So your brother and your mother stayed in Vienna with the factory.

HERZSTARK: Yes, with the measuring tools. And after two or three years the factory was closed, because [there] was no business. No nothing, nothing at all.

TOMASH: They never went back into the calculating machine business?

HERZSTARK: No.

TOMASH: And your mother? When did she die?

HERZSTARK: My mother died in '56. She was 80 years and 3 months old, just a minute... she is 75... Yes, in January '56... so in 1956 in January she died. As a retired, private person.

TOMASH: Now let us continue... You saw that there was nothing practical to do in Vienna with regard to your new invention.

HERZSTARK: I decided to emigrate, to try to make something out of this invention with foreign financial help.

TOMASH: One more question... Were you already married? A wife... Do you have a wife and children?

HERZSTARK: [I] was single. I made the decision to emigrate and then I wrote to a whole series of people and companies that I was acquainted with. I wrote to America: to my cousin Fritz Kreisler and to another well-known family, that came from Vienna earlier, so that they could possibly look for connections with Remington or other business machine firms that might be interested. They promised to do that. In the meantime, I also wrote to firms that I knew in Switzerland. I can show you a letter like the one that I sent. I notified these people that I had a new invention and I wanted to find support. I received an immediate response from the Tost (?) firm, the firm is called PRAZISA AG -- they make a good adding machine and still exist today. Mr. Tost said that he would like to have me come to Switzerland. I have the correspondence and I will show it to you.

TOMASH: You stayed in Vienna for three months...

HERZSTARK: I came to Vienna in December 1945 and was in Vienna until May 1946. Yes, so five or six months. In this time I assembled the three prototypes, corresponded with Tost (?) and with Terna (?) and all of them, and planned my immigration to Switzerland.

TAPE 2/SIDE 2

HERZSTARK: While I was doing all this, I was visited by two men from the Austrian Finance Ministry. Two gentlemen were sent from the Austrian Finance Minister to me and they asked that I not make any commitments anywhere else. They were commissioned by the country of Liechtenstein to look for talented professionals and inventions that would be suitable for that country. And after thinking it over well they, decided that I and my new invention were eminently suitable to introduce into production in Liechtenstein.

TOMASH: The Austrian ministry talked to you in Vienna? Or did he take you to Liechtenstein?

HERZSTARK: Yes... I was invited to come to the Liechtenstein Palace in Vienna by these two gentlemen. There in this palace I was received by Minister Joch, the Austrian Minister of Finance, and about 12 other gentlemen. It was disclosed to me that the Prince of Liechtenstein wants to desired up the industrial base in his country and was looking for projects and people. They had decided after thorough research that I was the man... the right man. They had learned that I had a new invention and would I like to show them the machine right now. I had with me the three prototypes, that were already assembled, so I was able to show this Minister Joch and two princes of Liechtenstein, who were also there. One was called Karl Alfred and the other one was called Fritz Ulrich. Then there were also present patent specialists and other people that I did not know. I showed them the machine in the Palais Liechtenstein that day and everyone there thought this was wonderful and this project should come to Liechtenstein. From that time on I was practically not let out of their sight. I was brought by one of these gentlemen to Feldkirch (Liechtenstein-Austrian border). I came there with an Austrian diplomat without all of my papers but with my prototypes, designs, and drawings. I was introduced to the Prince in his castle. He himself calculated with one of my prototypes. There were many family members present and also professional people. In any case, the Prince was immediately enthusiastic and said this project was the right one. He received me very charmingly and warmly and we had a three, four hour conversation. I was invited to dinner on the same day.

I was, of course, happy at the prospect of doing this pioneer work for the Prince and for his country. I decided to undertake a large project building everything from the ground up. The next few days the Prince spent talking to some gentlemen about the financial needs of the project. I said, "To start production in Austria or in Germany, I had earlier estimated a requirement for about 2.5 to 3 million Marks, expenses for the start-up costs for production, but only for the production, not for other secondary items, such as construction of a factory. That would already have to be there." The Prince was made aware of all of this. But I said, " I cannot give a valid estimate in Swiss Francs. I do not know what the exchange rate for Swiss Francs is and I do not know what production machines and prices are now compared to the German prices in 1938." I also said to the Prince, "I would like to travel to Switzerland to apologize to my friend Jost (?). He had planned to start production with me and now I have to decline his offer if I am to undertake the work here." They agreed and said, "Go to Switzerland, inform yourself of all of the prices so that we will have a valid estimate of what investment needs to be made. You can also take care of your private business with your friend Jost (?). And when everything is taker care of come to us and let us know."

I went from Liechtenstein to Switzerland and met with President Jost (?) of PRAZISA AG and apologized. He was actually very disappointed and affected by my decision. But he was really a good friend and he agreed that if the Prince had such great plans, he could not compete with that financially. For him, the project would have been a very normal thing. He had suggested that I become a technical director at PRAZISA AG for the department making these calculating machines. Everything else needed was already there at PRAZISA. Because I already had prototypes, they planned to only make a small pre-production run so that they could work their way into production. Otherwise they foresaw no major problems. The machine works, I had the drawings and the patent applications. With all this material and background, reaching a daily production total of about 300-400 machines would be no problem.

President Jost (?) was such a good friend that in spite of the fact that we would not be working together, he traveled with me for three weeks through all of Switzerland and helped me obtain prices on the equipment I needed. So, President Jost was really fair and at the end before I left he said, " I wish you much success with your project, with the salvation of Liechtenstein, that you are so eager to build from the ground up. You will have a great deal of work and hopefully you will be compensated for it properly."

TOMASH: So, you left Switzerland and returned to Liechtenstein?

HERZSTARK: I came back to Liechtenstein and that was the beginning of July, 1946. I reported to the Prince's administrators what I had learned of the prices and such. I told them that I was of the opinion, because the prices were higher, that we needed at least three to four million Swiss francs to become established and to start manufacturing.

TOMASH: Did this figure include the building?

HERZSTARK: No. Without construction costs. My figure was only the manufacturing costs assuming an existing factory building is already there. My estimate did not include any land or constructing the factory. I was not able to calculate that at all. I could only calculate what I needed for the manufacturing and the parts. So I estimated at that time about 3-4 million Swiss Francs for this job. The Prince was informed of all of this. Also I made the condition that

I would have three or four people from my old Herzstark factory colleagues so that I did not have to attend to every detail myself.

TOMASH: How long did the Prince take consider your proposal? And how long did you estimate it would take to get into production?

HERZSTARK: I saw that nothing at all was there yet: that property must be bought and a factory must be built. Even more important, I saw that personnel must be recruited from somewhere, because Liechtenstein had no technical work force, and therefore we would have to attract them from Switzerland or Austria. So I calculated that three or four years was necessary, no? I could not seriously to say that something like this could be done in a year or two. There are so many unforeseen occurrences, which one cannot know at all. In any case, so far as I was concerned, the Prince was acquainted with the fact that one needed approximately four million Swiss Francs alone to begin manufacturing -- to say nothing of the cost of factory construction and all of that, no? The Prince took all of this into consideration and I was informed that a factory would be built on this basis, no? A piece of property will be bought. A factory will be built. I expected that I would naturally be involved in all of these things and give advice if it were needed, that was clear. So, I expected I would have the overall Directorship. I would, of course, have employees to help me, above all my four or five Austrian colleagues, and then other people from Liechtenstein. I also requested of the Prince that he provide me with a Sales Director, someone from Liechtenstein or Switzerland -- a person who knows the local customs and all of that, no? I am, of course, a foreigner, besides which I am concerned with all the technical matters. I am so overloaded, that I do not have time for overseeing such things as the accounting and such, no? So, all of this was known. This was the way I had imagined things would be organized. I also expected that I would get a royalty on each machine, for the idea, about five or six Francs for each machine. A license, no? Approximately, no?

That was the beginning of July. Unfortunately on the 10th of July I became very ill with a lung infection and pleurisy and was taken to the hospital. I was taken care of by a very good doctor, Dr. Reinlger (?). Penicillin was available and saved my life. After about four weeks in the hospital, the doctors said I was strong enough so that one could do business with me. Although they also said that I would have to be under medical supervision for months, in case tuberculosis developed.

At this stage, just when I was able to do business, suddenly two unknown men showed up and introduced themselves. They said they were sent to discuss the establishment of the factory with me.

TOMASH: Did I understand? You were to receive a position as Technical Director rather than the Managing Director and five, six Francs per machine for the patent rights?

HERZSTARK: Yes. Five or six Francs for the license of the patents. That was the way it was originally, no?

Now, when these gentlemen came, I was naturally very surprised. Suddenly I was no longer dealing directly with the royal household. As soon as I started to talk to these gentlemen I said, "I have already discussed everything with His Highness. About the prices and everything." To that both of these gentlemen replied in an amused manner, "Mr. Herzstark, we have to make you aware of something. One cannot expect of a Sovereign that he concern himself with details. His Highness has established a financial and administrative group to oversee such matters. We both represent this financial group called the Office of Administration. We are now establishing our first industrial group. Your factory, where the small, hand held calculating machines will be produced, is to be part of this new group.

Now, I was naturally disappointed in this news, but what should I do? I was sick and helpless and did not realize that there was anything especially bad here. So I reviewed my understanding of the agreement with the Prince with them. They were informed that one needed approximately four, five... three, four million francs for manufacture. And that I expected a license fee of 5-6 francs on each machine. We continued on this basis to discuss everything else that needed to be discussed.

Several days later they came again and then they said, Mr. Herzstark, we have a much more interesting suggestion for you. Wouldn't you like to become a partner? Instead of only giving you patent license fees, we would establish a joint-stock company. We could give you, let's say, one-third of the shares for your patent and then you will be a co-owner." Now, I thought, that is actually very generous, no? So I agreed to become a co-owner in this factory. I said, "Yes, if you want to do that, that's fine with me. Please give me some suggestions about how." When they returned a few days later, the largest surprise and disappointment came. A joint-stock company was established with one

million Swiss Francs in capital. I was to receive 35% of that (in shares) for my invention. The other shares would be owned by the Prince for 650,000 Swiss Francs. "Gentlemen," I said, "One cannot even begin with 650,000 Swiss Francs. You want to buy a building site. You want to build a factory. You want to buy machines. I am supposed to accomplish the organizational build-up. How can I cover [the costs] with 650,000 Swiss Francs? That is maybe 10-15% of the amount that we need."

The gentlemen interrupted me and said, "Mr. Herzstark, there is no need for you to concern yourself with all of that. The required money will be there. Only the corporation will be established with this capital. We will borrow the rest from the bank." I was concerned and asked for more information. They said, "This is the only way we can do this. Please, if you do not consent then we are very sorry, but we cannot go forward." Now, their position was stated very clearly. What could I do as a sick man in the hospital without any money, no? I had burned my bridges and could no longer do business anywhere else. I thought to myself, "I hope, in God's name that this is the way it really works out." A friend of mine was there who also had listened to everything. He said, "You are naturally -- excuse the expression -- between a rock and a hard place. You are sick, helpless. So you have to consent; you have no choice. You are employed as Director. You will get your salary and you can live on that. The factory will be built and after a few years when the factory is working the debts can be repaid. The factory will have to take out a loan for at least three, four million Swiss francs. The loan will certainly be with the Royal Bank, which also established the factory. After three, four years, when the loan is paid back, your stocks will surely produce dividends." So, in other words there was no alternative. I signed the agreements on this basis. And when I was healthy, I started to build the entire operation from the ground up.

TOMASH: So, of the business, of this joint-stock company you owned 35%, the others had 65%. The total costs invested was 650,000 francs?

HERZSTARK: 650,000 cash capital.

TOMASH: Besides the cash capital, the company borrowed from the Bank...

HERZSTARK: Yes, loans! I could not do anything else at the time. Everything was done without me, no? I was

given a 10 year contract as the Director, the Technical director. I had a reasonable salary on which I could live." And I had the promise of stocks. By the way, I never received them. I was promised 350,000 Swiss Francs in stocks, as additional compensation for my rights. That is the way I understood it. I was of the opinion that with this salary as Director I could live, and the factory would be built. The factory would make money. Naturally, we would have to repay the debts first and then, whenever we are no longer are in debt, the stocks will produce dividends. That was what I assumed.

And from the very beginning it was written in the contract that the administration and organization would be undertaken by the Office of the Administration until the factory was complete and functioning. This meant that everything that I wanted to do or buy for the factory had to go through the Office of the Administration. If I wanted to buy a production machine or hire someone, I had to discuss it with them and then send the whole thing to Vaduz to the Office of the Administration for their approval and action. So, I was practically completely dependent on the Office of the Administration. But in spite of these difficulties (I would have to talk for hours to tell about all of this) I succeeded in bringing the CURTA to the market. The CURTA machine was in production without technical problems within four years. During these four years the factory was built and the production was organized. In '49 (or was it '48?) in the fall, the first deliverable, saleable machines left the factory.

TOMASH: 1948 or 1949?

HERZSTARK: In '49 we went to the Basel [trade fair ?] in May, I think. I went there with the machine. There are pictures.

TOMASH: The name of the corporation that was set up to handle the CURTA calculator was called Contina AG?

HERZSTARK: Yes. The factory that was set up at Contina was completely integrated. We had our own plating facility, our own machine works, and our own final assembly. The entire CURTA production was completely integrated, except, of course, for simple machine screws and ordinary little parts that we bought outside.

TOMASH: So between 1946 and 1949 the operation was set up. The first production CURTA calculators were

shown in the Basel Fair in May of 1949. And how much money did the Prince invest to bring you to that point?

HERZSTARK: Until production began? That was approximately three million. So the sum that I had estimated, was not exceeded at all. There was even a small reserve there, no? So, what I had said was correct. But, of course, the factory started with only 650,000 francs of capital and it had debts with the Bank in Liechtenstein. I had nothing to do with that. I only concerned myself with the technical aspects and with the promise, that I would receive 35% of the stocks. I was the Technical Director.

In 1950, a stockholder's meeting was called and, of course, it was revealed that the firm was in debt, that the firm had debts of two million and that the share capital was only 650,000, no? This was an abnormal situation, no? It was decided that the business had to be put on its feet again. The bank in Liechtenstein encouraged this. They were the financiers, ut the bank also belonged to the Prince. Then it was disclosed to me that the firm would have to be reorganized; that is, refinanced. And I would have to somehow agree. At first I did not understand what they wanted from me and then I understood. The old stocks would be annulled and new shares issued for new capital. I could join in the new investment if I desired. Yes, then I finally grasped [that] I would never see my promised stocks. The firm would begin again "fresh" and they thought that I would stay on but now I would be the Managing Director for the whole operation, not just the Technical Director. But they would continue to make the decisions up there in Vaduz but would not have the responsibility. In other words, a completely absurd situation, no?

And then came a stroke of very good luck that I could not have imagined at first. The CURTA patents that I had invented were still in my name. This was with the full knowledge of Contina, who had not wanted to take over the patents at the time of the founding of the company. This was done so that any competitor who had objections would have to object and perhaps come to trial while the patents while the patents were still in my name. Contina wanted to be out of the loop. In the case something was not normal, they had to attack me personally as the inventor. So the patents stayed in my name. When they told me that I would not receive any shares in the reorganized company unless I bought them, the patents were still in my name. At first I did not understand this. I was spiritually completely beaten because of these disappointments. Then the good Lord cleared everything up. Our patent lawyer was Fritz Gieler. He was the Trustee of the patents for the Contina, and also represented me for the patents. At the closing of the new contract, where I did not receive anything, I only remained the Director, he had been on military

duty for months and had nothing to do with it. When he returned and was informed of this new organization, he looked at it closely. He went into a rage and called these Contina financial people very bad names. He studied the whole matter and then he said suddenly, "Mr. Herzstark, there is something very interesting here. According to the Contina Contract the patents are still in your name. The patents belong to you. You do not have to give them the patents, because they are not giving you anything for them. They overlooked this. They thought that the patents had already been signed over and that you were already completely useless. God has helped you."

At first I was appalled by this disclosure and thought that another test, another trial, another fight is coming. The patent lawyer said, "Mr. Herzstark, the law is on your side 100%. One has to speak to gentlemen gangsters in their own language. I have to represent you whether you want to or not, since I am Trustee for the patents for both parties. I will inform the people in charge of Contina that it is essential that the patents be obtained by them somehow. Otherwise you could close Contina's doors on account of the patents. The patents are registered internationally and issued in many countries. If someone wants to use the patents they have to deal with you. Or to break them they would have to sue you to give up the patents. The rights in question are not from Liechtenstein. The basic patents are issued in Bern, in Frankfurt, over in America. This would be the largest scandal that there ever was, if it came out into the open. I have to tell the decision-makers at Contina what the situation is whether you want to or not, or whether it is embarrassing to you or not. I am sorry that you are continually pulled into these nerve-racking situations." Mr. Gieler has told the decision makers that because of the reorganization of Contina, the patent was a major problem -- that they were legally registered in my name. He told a certain Dr. Ritter and Prince Heinrich of Liechtenstein. He explained to them the true situation. Naturally, this was a great surprise to them.

After some time, I would prefer not to give the details, I was again approached and they said, "Mr. Herzstark, we would like to take care of these patent matters. You will remain Managing Director and we will buy the patents from you." But I said, on the basis of experience, "I am aware of the new situation. I am prepared to sell the patents to you. I am decent enough to sell you [them] for the sum of 350,000 Swiss Francs, which was the original amount of my share. However, I will not remain Technical Director or Managing Director. I am resigning. I built all of this up and there are no technical problems. But I know very well that a partnership is not possible between me and the Office of the Administration. Our views on company direction are very different. I wish you good luck. You are going in the right direction but I am retiring from active management. I will be here to consult and to help, but otherwise please do

it yourselves." I hoped to myself for their success because I was still very attached to my invention and to the factory. I felt positively about it and did not hate at all. I thought that they will not succeed and they will probably try for two or three years and finally they will have the insight that they are on a wrong path. And then I can perhaps reorganize the firm again. And in the meantime, I invented a series of improvements for the CURTA -- features that I had not yet incorporated in the machine. And I applied for a patent for these features, and waited.

TOMASH: When was this matter settled with the patents?

HERZSTARK: 1952.

TOMASH: 1952, you left Contina and moved away from Liechtenstein.

HERZSTARK: I concluded filing the patents on the improvements by working intensely in Vienna.

TOMASH: Did you ever finally obtain a royalty fee -- the 5 Marks or 5 Swiss Francs?

HERZSTARK: No. Never.

TOMASH: You received a flat sum?

HERZSTARK: A sum. They paid me for many years in installments. They surely had to give my rights. Under the agreement they always had to give machines to a bank in Switzerland as a deposit, so that I was covered. I would prefer not to comment too much on these details.

TOMASH: Yes, but they ultimately paid you?

HERZSTARK: Yes.

TOMASH: Tell me about the personnel you hired to be managers when you were in charge of Contina.

HERZSTARK: When I began the factory, I had no-one. I had to advertise in the Zurich newspapers. I advertised for

young, ambitious mechanics -- capable mechanics who could build a career with us from the ground up. After I received responses to the ads, I visited these people personally. If I thought them competent, I invited them to come to Liechtenstein for two days. I asked to make a part that I showed them so that I could see whether they could do the work. And when I knew that, I had to tell the Office of the Administration, "This mechanic so-and-so, I would like him." And they would give him an employment contract. So I was always limited by the Office of the Administration. I was never able to make arrangements myself.

TOMASH: Did you bring people here from your old factory in Vienna?

HERZSTARK: I had requested that at the very beginning when everything was being established. That was a condition, that I would have four or five people from my old factory. They promised me that.

So I wrote to these people in Vienna and asked them to join me. And then I waited. Again and again the Office of Administration put me off, "They will come already. They will come." And then, one day, Herr Chubb (?) from the Office of the Administration said, "Mr. Herzstark, I am sorry but the wicked Immigration police will not approve an entrance visa for these people." Later I discovered that this was a lie. I know people who were with the Immigration Police and they told me that no request for visas was made at all. Since I was looking for technical people, the visas would have been approved. Unskilled workers, servants, for example, they would not have approved. But technical people who would live here, would have been approved. So it is not true at all, that the Administration had applied.

Then interestingly enough the following happened: I had requested that we hire a Swiss (or Liechtenstein native) Sales Director, someone who was well acquainted with things here. In response, I was told that to this Mr. Chubb (?) of the Office of the Administration would handle Sales. I was told he was Swiss although he was really German. For years he got the best of me because he always spoke "Schwiezerdeutsch" [Swiss German].

In 1952 they made a contract with me in which I transferred ownership of the patents to the Contina Firma and they had to pay me 350,000 Swiss francs for them. That is how the matter was finally settled.

TOMASH: After that did you continue to work there or did you leave?

HERZSTARK: First I took a vacation. And afterward I did not set foot in the Contina factory again. I did my work from the outside and I only dealt with the Office of the Administration in Vaduz. After December 1951, I never went into the factory again. But, of course, the production was already running perfectly smoothly. And there was a group of well-trained people in the factory, mostly Swiss. Later, most of these people left the company when these differences arose, because they could not trust the company anymore.

TOMASH: And then what did you do afterwards?

HERZSTARK: Afterwards? At first, I thought that I might work for the Contina company later. So, I worked more on the CURTA. I also made designs for an accounting machine. This was based on my earlier experience. I worked a little more with precision gauges. I also was a consultant for companies quite a few times. I was invited, for example, to Italy to the Lagomarsino Firm, which made the Totalia (?) and the Momalie (?) machines. I went there as a specialist technician to review the design of the mechanism and to make suggestions for improving the construction of the machines. I also consulted with the old Burli (?) Firm which had started to make adding and accounting machines. I still had correspondence with other people and firms in the business. This activity was private and discrete. I did receive a little something for it.

TOMASH: And you continued to live here in Liechtenstein?

HERZSTARK: Yes, I continued to live here. I always lived here.

HERZSTARK: I came to Liechtenstein in '46 and moved into this apartment in 1949. I have lived here ever since. In the meantime, I had married and had two children, and they also lived here. This is the apartment where my wife and my children lived with me. My wife, who is Viennese, was naturally not very enthusiastic about living here. But she lived through all of this with me. She always wanted to go back to Vienna and as soon as we had the means, she went to Vienna with the children. Naturally, I covered all of their expenses, no? But since 1954 they have lived completely in Vienna.

TOMASH: Yes, I understand. And so you never went back to work for Contina or became involved with CURTA manufacturing?

HERZSTARK: No, no nothing. I did not even see the inside of the factory again (?). After a few years I realized that Contina could never become something healthy. If one looks at it in a very basic way, if one wants to produce calculating machines, that requires a total devotion of energy and resources. To try to diversify into measuring instruments, cameras, record players, etc. with such a small factory, with such a small amount of capital, that is insane, in my eyes. Yet that is what they tried to do at Contina. I mean, even a normal salesman can tell you that nothing good would come out of that.

They also made, for example, a film camera. It was a nice design from a designer in Munich. They had to buy the optics, because they did not make that. They made the housing and the automatic part. There were already a dozen on the market. And when they came out with this camera, with that kind of competition, they found they had to do a great deal of advertising, so that it would even become known. These people were not at all aware of the fact that there are costs for introduction even if you have the best product. So they made this fine movie camera and only a few dealers knew of it and sold it. So they only had losses, no?

So, in any case, they continued until '66. Then it was finally clear to the Office of Administration that they could not continue like this. They sold the firm to the Hilti Firm, a Swiss company. Hilti bought the firm because they wanted the personnel and the factory building. They threw everything out that was in the factory in 1966 except the CURTA. They allowed only the CURTA to continue, because it was popular, desirable and was profitable. It was in production smoothly. The patents were good until 1972.

TOMASH: The Prince supported Contina until '66 and then he sold it to the Hilti Firm?

HERZSTARK: To the Hilti Firm. I am not familiar with the details, and, I would rather not say anything about it. I can only pass on rumors about the numbers. I heard that the Princely house lost over 12 million but please, that is none of my business. I had started with the genuine intention of building up Contina. After 1952, I could only experience what happened with Contina and with the CURTA.

TOMASH: After 1952, Mr. Herzstark left Contina and was a consultant to a number of business machine companies, but no longer participated in Contina. In 1966, the Prince of Liechtenstein sold the Contina company to Hilti. Contina had tried to diversify into many different products and had failed. Mr. Herzstark has heard estimates that the Prince had invested about 12 million Swiss francs in Contina. When Hilti took it over, they discontinued all of the other products but remained with the CURTA.

HERZSTARK: Hilti made the CURTA from 1966 to 1972.

TOMASH: The CURTA was made until '72 and then the electronic calculator came on the market and replaced it.

HERZSTARK: Contina continued to make exactly the same CURTA. They did not make it larger; they did not change anything. They continued with both models. No technical changes were made. It was like this since 1954, always the same. Yes, they did make one that was a different color. Also they changed the handle. This rounded tip on the handle was important not only for symmetry. I designed it so that when it was inside its case, the tip was seated on this rubber insert in the cap. There was also a rubber insert on the bottom of the case -- so that even when the machine it was still safe. In order to save money, they made the handle out of Bakelite and lost this safety feature because it was not positioned properly in the case.

TOMASH: Mr. Herzstark is showing me the CURTA in its case and explaining that there are rubber inserts in the base and in the cap. The Hilti people made a change in shape when they went to a new material, not understanding his purpose in having the CURTA nested in rubber in the case so that it would not shake and would not be damaged if it was dropped or fell.

HERZSTARK: So, these are just details.

HERZSTARK: They continued to build according to my original principles.

TOMASH: They stopped production sometime after 1966? This was after Contina was acquired by Hilti?

HERZSTARK: Yes, in 1972 stopped production. This was because of the availability of lower cost electronic calculators at the time. Aside from that, the patents had all expired and Hilti did not want to make new investments.

TOMASH: So the electronic calculators from Japan came and now...?

HERZSTARK: And since they have done nothing in calculators. Three or four years ago a clipping was sent to me from a Zurich engineering journal (?) about electronic calculating machines. The author, an engineer, Dr. Hurrivan (?) wrote about the new electronic calculators. He said that before they had become available there was a "miracle-machine," the CURTA, and drew parallels between the electronic calculators and the CURTA. I had known nothing of this Dr. [Hurrivan]. Engineer Maier (?), who had worked with me earlier, subscribed to this journal and put the article from Dr. Hurrivan (?) in my mailbox.

I was surprised when Dr. Hurrivan (?) phoned from Bern a few days later. He was a very important official with the Post Office. He was in charge of the Postal Inspection. He wanted to get to know me personally, no? He had two CURTAS for 20 years and would be happy to meet the inventor. So I went to Bern and was introduced to Dr. Hurrivan (?). He said that he had never seen anything so wonderful in construction and design as the CURTA, and congratulated me. He has published about the CURTA three or four times, because he knew the machine well.

TOMASH: Now, Mr. Herzstark is showing me a new, interesting, improved CURTA. But Hilti did not choose to make the new one?

HERZSTARK: No, this new machine does not have anything more to do with the CURTA. Actually there was always a dead silence from Hilti about the CURTA. I received communications from all over the world about the CURTA. Authorities by the dozen wrote about the "miracle-machine". Why this invention was not exploited for its full potential I'll never understand. But I always had to be discreet. I always wrote, "If you would like information, call the Contina factory or the Office of Administration. Do not ask me,"

In any case, there was dead silence about the CURTA. Whenever one heard of Liechtenstein, one heard of the

beautiful stamps and the scenery, but not much about the unique article, the most important of its kind in the world. Had they done so, the reporters would have then asked the public relations people, "Why was this not exploited to its full potential?" Then, they would have had to explain. I mean, what a scandal that would have been -- how incapable they were. So instead there has been a complete silence up to the present.

Now it seems that a new generation is interested in the subject, even here in Liechtenstein. For about a year, people from the government have been coming to see me. They want to know my life history and everything about me and the CURTA. I hear, a museum will be established for Liechtenstein products. These people said, after they looked at everything closely, "The CURTA is unique, the most international of the things we have in Liechtenstein." Even if the stamps are pretty and they make millions, they are not unique. Hilti makes good products, but similar machines are made elsewhere. But no one else has made something like the CURTA in the whole world. Technical people around the world recognize the CURTA as a brilliant piece of work that only reached 1% of its potential here.

TAPE 3/SIDE 1

TOMASH: Part number five, side five of the interview with Curt Herzstark in Nandeln, Liechtenstein, Friday morning, September 11. Mr. Herzstark, do you have any idea what the total production was for the CURTA?

HERZSTARK: Yes, the numbers that I had heard vary somewhat. There were at least 150-160,000 units made. Some people state that there were somewhat more manufactured. But, it was somewhere in this range. And the opinion of marketing people I have consulted with was that, for this machine, one should have been able to sell at least 2-3 million in the world market, and that very easily.

TOMASH: 150-160,000. Do you have any data on reliability of the units?

HERZSTARK: The statistic I heard was that our warranty repair rates were only approximately 3%. That means that out of 100 machines, there were only three machines where something was not working properly. So the machines were really made well and built-to-last.

TOMASH: Did you continue to design more calculating machines?

HERZSTARK: No, but I read a lot, no? And I worked out solutions to certain technical problems associated with calculators. I did not come out into public as an expert. I continued living here quietly. I made myself at home here and became old here, no? I always had something to read but I no longer concerned myself daily with the calculating machine. Naturally, if I had remained with Contina in a leadership position, I would have been following the technology constantly. I certainly would have closely followed the developments in electronics -- perhaps to enter the market for electronics calculators, or, at minimum to judge how important electronics were as competition for the CURTA. That would have been an obvious thing for me to do, but under the circumstances it was uninteresting for me.

I would like to mention the following: when I first built the Contina, it was very modern. I also opened a patent department, the way it is in every large factory. I staffed the patent department with a well-known engineer who knew his field well. He spoke English very well. So when I left Contina, they had in place a patent department which I had established to follow market developments and protect the patents. When these differences with me began, naturally the patent engineer sided with me against the stupid things that were happening. They dismissed him on the spot, locked the patent office and turned all patent matters over to a lawyer.

TOMASH: Did Contina have a sales director? Did they have a sales organization around the world?

HERZSTARK: The Contina firm was only a factory. It was dependent on the Office of the Administration and they in turn organized sales. Obviously, they organized the sales effort relatively badly, otherwise they would have had very different sales figures. The CURTA was sold all over the world, not only through the work of the sales organization, but also because the CURTA became famous. Orders came from all over the world without the help of the sales organization. In my opinion the sales organization was very poor. Expert technical marketing people, who knew the field, were all of the opinion that several million of these machines could have sold if it had been introduced properly on the world market.

In Liechtenstein, however, no one even knew that such a machine existed. So no one came to buy for that reason. If one wants to buy something, one has to hear about it or be acquainted with it, no? For example, I experienced the

following personally in Germany. At a major trade fair there, they had given the rights to CURTA sales to a general representative. I went to the exhibition booth without anyone knowing who I was. There was a young woman in the booth and there were the CURTAs. I asked, "Miss, what is this?" "This is a calculating machine," she replied. "Can you show it to me?" I asked. "I will give you a brochure and you can read it," was her answer. Well, if that is the way sales work is done how can anything be sold?

I mean, I had learned in my youth to go out to sell and we did not wait until the customers came. Take, for instance, the famous Swedish factory Ohdner. I learned from Ohdner in 1926, how it is done. I remember going to Czechoslovakia in 1926 and selling machines very well. But then I suddenly noticed that there were Ohdner machines everywhere. They were a very primitive model, which did not even have a control register (operation counter). I wondered to myself, "How do they sell?" I saw that Ohdner did everything very differently than the way our factory did. They hired young, intelligent people, and trained them very well on the Ohdner. After training, each man received a sales territory and went from door to door and business to business. He showed the machine and showed the customer how to use it. And such sales people delivered 20-30 individual customers per month. Ohdner had, for example, eight to ten of such young people and they sold one machine right after the other only because they went out and prospected. They did not wait until the customer to come to them. Sometimes they even provided a machine on a trial basis. I learned that then and imitated it and my efforts were soon rather crowned with success.

TOMASH: I heard that long ago Ohdner had made a cylinder machine. Do you know this machine?

HERZSTARK: The Ohdner machine is relatively difficult to operate. When one enters in a digit it is recorded by some very small pegs. In spite of the large size of the machine, the pegs are hard to read because they rotate and disappear. They are close to each other, perhaps closer together than on the CURTA here. And when one enters something, this machine did not even have an operation counter. One has to read this very quickly. Then turn with this handle. The machine is also rather loud. In the CURTA, here one has the count (control) and there, the product. When the calculation is finished in the CURTA, one has to clear by simply turning this 360 degrees. In the Ohdner, when one has to clear the clearing operations take very long. The CURTA calculates much faster, although it is often compared to the Ohdner.

TOMASH: Where did you get the name CURTA?

HERZSTARK: That is also interesting. Originally I named the machine the Herzstark "Lilliput".

TOMASH: Lilliput. Yes, I saw that. I noticed that the early technical drawings from Buchenwald bore the name "Lilliput."

HERZSTARK: Yes. And now how it came to be given the name CURTA. As I said, I thought at first of the name "Lilliput." "Oh, that would not mean anything," they said in the Office of Administration?. Mr. Chubb said, "We do not want any clever, complex, tricky names." He then proceeded to suggest many completely crazy names. At that time, we had a Dutch woman as a sales correspondent. I have the picture there. She listened to this argument about names and then she suddenly said, very quietly, "Gentlemen, I so not really understand the discussion of such crazy names. The inventor's name is Curt, this is his 'daughter'. Why don't we call it the CURTA?" And that suggestion was accepted by everyone. Thus, the machine became the CURTA, the feminine form of my name. So, it was not my doing but the doing of Miss Remarke (?). You can see her in this picture at the Basel exhibition booth. Originally they wanted the craziest of names, the Office of the Administration was not willing to bring me much into the public eye.

TOMASH: I would like to ask about early contacts to American firms, with Remington Rand, with Burroughs or National Cash.

HERZSTARK: With Contina, I personally was no longer in contact, no? My first contact, after Buchenwald, was with an American Major, I think his name was Rembrennt (?). He was in Sommental (?), because this was the area occupied by the Americans. He inspected the Rheinmetal works, and he saw my CURTA prototype then. And he said...

TOMASH: Could you tell me his name again?

HERZSTARK: I think Rand was his name. My recollection was that he was supposed to be a relative of James Rand

or something. His grandfather or someone was the well-known Rand. He spoke German badly but we could understand each other anyway. I think his name was Major Rand... Rand! Anyway, he saw the CURTA model standing there. He said that it was something important for the whole world and the Remington firm would surely be interested. I asked him a little about how the American firms might do that. He said, if he were able to for the company, he would buy something like that for Remington Rand. He could pay \$150-200,000 for such an invention. At that time, that was a real sum of money for me. He also said I would be required to come to America for a year so that I would be there to handle any special problems. Remington Rand would handle reproduction themselves. I would be happy with the money and could do what I like after one year. Of course, I could calculate from the number of sales people they had how much business they would do in a year. And I wondered if they were offering me enough to give me financial security. He also said if the Thuringian area remained American, Rheinmetall would be taken over by the Remington concern. They had already to all intents and purposes taken over the Trumple typewriter factory in Frankfurt. Trumple was being reconstituted with Remington capital, he said.

So I continued my contacts with him, and when I was in Vienna I sent the documents to America, to Fritz Kreisler and also to another family, I don't know the name right now, who also had connections, with the request that they follow-up with Remington Rand. That was shortly before the opportunity arose with Liechtenstein. I lost interest then because I was suddenly very enthusiastic to be the Messiah from Liechtenstein.

TOMASH: I understand. Were there many sales of CURTA in America?

HERZSTARK: I am completely uninformed. Everything I know about sales is by rumor from Vaduz. All positive and negative business results go to Vaduz, no? I was only responsible for the technical end.

TOMASH: I see. Do you remember the name of the man who ran the CURTA program from Vaduz?

TOMASH: The name of the man in Vaduz who was in charge of the Office of Administration.

HERZSTARK: The office in Vaduz was originally called Office of the Administration. There were two German men there who led the business. I mean, I only know these details from hearsay, everything was done so quietly, even

discretely, no? So, in any case, the Office of the Administration was in charge of sales and finance. For me, that was all taken care of and I was never enlightened [eingeweiht]. In the first years, I was just used as a front man because my name was well-known. I was used for certain lectures, no? I gave many talks in Germany at various Universities and other places. I talked about the CURTA or talked in the interest of the company. But, aside from that I did not have anything to do with sales. After a short while, I said to myself that it did not matter. One cannot work with these people and I let it go. Others sold it, or tried to sell it. I do not even know the details. A small firm was established in Germany by Contina. The one-time director of Rheinmetall, Herr Weisshardt, became manager. Several times he said to me, "Mr. Herzstark, I have to do it their way. It is my living. But you know I am killing myself; my work with these people is so difficult. I am old hand in the calculating machine business, but it is difficult for me to sell the CURTA for this firm.

TOMASH: Are the people from Liechtenstein who are building a museum interested in receiving documents from you?

HERZSTARK: Yes, they want as many of the documents as possible. They do not want them to go out of the country, no? The new generation seems to be looking at the mistakes that were made on their side. Now, as the new generation matures they have become aware that this CURTA was actually of world-wide importance. They are now interested, if a technical museum is built, in seeing to it that the CURTA should have the place of honor, because it is the only unique technical product that Liechtenstein has had. All of the other Liechtenstein products are certainly very nice. It is a nice country. There is nice scenery. They have nice stamps. They have a large enterprise, the Hilti company, but the Hilti products are not unique. They made very good things, but these are also produced somewhere else. They have nothing that is original, that was internationally acclaimed, no? It is not the inventor who made it famous, rather it is the technical professionals, who know the field, who are impressed with the machine. Not just with its sales, but with respect to its design.

TOMASH: And the early models of the CURTA, the pre-war work, they are going to be sent to Munich?

HERZSTARK: Yes, Munich. They have already collected lots of things without my doing anything. I expect I will send things to the Munich museum. What is that called?

TOMASH: Deutsches Museum?

HERZSTARK: The Deutsches Museum does not yet have a special department for calculating machines and electronics. These things are being temporarily kept in reserve. But they already have CURTA machines.

TOMASH: I heard that they be opening an exhibition next year.

HERZSTARK: Yes, yes. And the CURTA will naturally be important there, no? As far as I know, and I don't know everything, they already have a dozen CURTA items of all kinds stored there, no? The few times I had the opportunity to talk to the researchers there they all said that the CURTA is a very special thing that they are putting much emphasis on.

TOMASH: What about the museum in Vienna?

HERZSTARK: In Vienna, the technical museum has many calculators and some CURTAs, which are only temporarily (not specially) displayed. It is more of an historical display. They have a few old models from the 17th century among other curious instruments, as well as calculating machines. And they have CURTAs in a show case there but without any exact explanations. I have been told that soon will be displayed more effectively. They have asked me for material and I have written various items.

TOMASH: Do you have anything else you would like to tell me?

HERZSTARK: I have to look a second time to see what I still have.

TOMASH: Mr. Herzstark is showing me a Mercedes calculator that belonged to his father. It is a beautiful instrument. It is a circular machine, circa 1900, one I have never seen before. It does not appear to have a model number on it.

Mr. Herzstark also has a list of patents taken out by his father. These are about 25 patents dealing with adaptations, additions and improvements to the Thomas calculator.

Mr. Herzstark has found a patent describing the Mercedes machine. It is number 832666 patented October 9, 1906, titled C. Hamonn calculating machine, Application filed March 28, 1905. The machine, a model which belonged to his father, was a circular machine, not cylindrical machine, but it was used in Herzstark United States 1455 case 2.

Mr. Herzstark, we have to stop now. It was a great pleasure for me to be able to come here and make this record. It made me very happy to become acquainted with you and to record this interview for the Charles Babbage Institute archives in the United States.

END OF INTERVIEW