Oral History of Morris Ringer

Interviewed by:
Gardner Hendrie

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Gardner Hendrie: Well, we have today with us Morris Ringer, otherwise known as Morrie, who has agreed to be interviewed for the Computer History Museum. Thank you very much, Morrie. I think what I'd like to start out with is just get a little bit of your family background, so we understand sort of what the potential influences of your childhood were in who you turned out to be? Where were you born and brought up and tell us a little bit about your parents and any siblings you had.

Morris Ringer: I was born in southwest Africa, now known as Namibia, and grew up in South Africa. My father had immigrated from the border of Russia and Germany before the turn of the 19th century. He was born about 1880, 1881. He immigrated to South Africa at the age of 19 in 1897 at the time of the Boer War in South Africa. He was very enamored with what he saw in South Africa and decided to stay there. He had originally gone there just to visit a friend, which is a long way from Eastern Europe. And he stayed there for the rest of his life. And I was brought up in the rural part of South Africa. My mother had immigrated in 1920 or thereabouts from England. She was born and brought up in London, met my father in Capetown; he convinced her that the northwest part of the Cape, which was on the border of the Kalahari desert was in fact the Garden of Eden. She found out differently when she got there. But that's where he stayed and that's where they stayed. And I was brought up there in a rural environment. The village at that time had approximately two to three thousand white residents. About five hundred miles from Capetown. Very rural. The black residents at the time, or the non-white residents, the colored residents, was about 6,000. Very safe, rural, everybody knew everybody kind of environment. And I got my engineering education starting at the beginning of the Second World War in 1940.

Hendrie: Did you have any siblings?

Ringer: Three sisters.

Hendrie: Older or younger?

Ringer: Two of them are older; one of them is younger. The eldest one is no longer alive. The second sibling, she lives in Laguna Woods here in California. And my youngest, she's now living in Israel.

Hendrie: Was your father a farmer? What did he do?

Ringer: My father bought and raised cattle; bought young cattle, raised them for a year or two, sold them to the meat market. And in those days, much as in the frontier days here in the United States, an automobile was not heard of initially, of course; 50 miles was a long, long distance between neighbors. During the Boer War, southwest Africa was German West Africa, German colony. And South Africa joined Britain in the First World War, and their job was to conquer and occupy Southwest Africa. My father was very familiar with the area and he was one of General Jan Smuts', who was one of the leading personalities in the South African political and military environment. He was in charge of the expeditionary force that conquered Southwest Africa; my father was one of his scouts. So I have that kind of background there.

Hendrie: When you were growing up and going to elementary school and high school, what are your earliest thoughts, memories of what you thought you wanted to do when you grew up?

Ringer: When I was about 7 years old, my mother's brother, elder brother, who was a chemical engineer in England, paid a visit to her and my family in Southwest Africa. He brought gifts and my gift was an erector set to build a battleship. He handed out the gifts on the day he arrived and when he gave me that gift, he said, "This is pretty complicated. After I've rested for a couple of days, I'll help you and show you how to put it together." He came a couple of days later and I had already assembled it and he pronounced that I was going to become an engineer. My mother informed me of that and kept reminding me of that through elementary school and the rest, and I just took it for granted that that was what I was going to be. Turns out that's what I wanted to be.

Hendrie: Okay. And you enjoyed it.

Ringer: Yes.

Hendrie: And you had shown a very early aptitude for figuring things out and putting them together.

Ringer: That's right.

Hendrie: What did you do after high school?

Ringer: In South Africa at the time, the Second World War had begun--

Hendrie: Your year of birth?

Ringer: 1923. Long time ago. In South Africa, like England, all of communications, telecommunications, radio communications were controlled by the GPO, the General Post Office. They had this engineering organization. And they used to buy their equipment naturally from the factories in England. The English factories used to send out English engineers to install and train in the usage of automatic telephonic communications, microwave, etcetera. When the war broke out, South Africa had acquired several new parcels of equipment. But the engineers from England couldn't come out because it was war and that carried a higher priority. So the South African post office established a school for training telephone and telegraph technicians. And a small percentage of them became engineers, went to the technical college, so they were equivalent to the co-op system that is practiced in this country, where you work for a company and you go to school. It was a five-year course, at the end of which I had a qualification called engineering diploma, and that's how I got my initial training.

Hendrie: So you studied electric engineering?

Ringer: Yes, electronic engineering. They called it "light current".

Hendrie: As opposed to "heavy current".

Ringer: Which is power. Yes. And a few years later, not very long, I studied physics and theoretically applied mathematics through the University of South Africa.

Hendrie: When did you graduate; were you working for the post office?

Ringer: For about two, three years. And then--

Hendrie: And then you went to graduate school?

Ringer: No, I first went to Israel in 1948, 1949, during the war of independence. Then I returned to South Africa, and attended the University of South Africa part time and was teaching at the technical college.

Hendrie: Tell me the story of how you got involved in going to Israel during the war of independence?

Ringer: Well, in Israel there was a war looming when the United Nations [passed a resolution for the partition of what was known as Palestine. Britain governed the protectorate of Palestine.

Hendrie: This is before 1948? The war is coming?

Ringer: That's right. In 1948 they knew [that the Arab nations were going to oppose partition politically and militarily with the intent of occupying all of what was then known as Palestine].

Hendrie: Before the partition agreement [was executed].

Ringer: That's right. And they knew that the war was coming because the Arab states were not accepting this. So we started groups organizing in different parts of the world. In South Africa, there were groups of young Jewish boys. This was just after the Second World War, so there was quite a number of people with special skills, particularly in the air force. There were pilots, which can take a long time to train, that had just had experience. People with artillery and that sort of thing. And in Israel, the Jews had very little of that personal experience because the British restricted that. So they recruited people with different kinds of capabilities and I, with the group, went over and I went to the Signals, which is the communication of the army, and first did that out of headquarters. And they were developing some secure communications, after which I was in one of the two armored brigades in an armored battalion in Israel as the communications officer. I was there for a year.

Hendrie: So you participated in some battles?

Ringer: Yeah, nothing spectacular, but yes. That happens when you join the army.

Hendrie: And they're fighting a war.

Ringer: Yes.

Hendrie: So you did that until the war was over?

Ringer: Yes. Mid-1949. Returned to South Africa. Before the war I was engaged to my current wife, and when I returned we got married.

Hendrie: What happened next?

Ringer: To me?

Hendrie: Yes, to you.

Ringer: What happened next to me. I got married and started having children, at least my wife had them, I instigated it. And I decided there were two things that were of concern. One was the racial tensions in South Africa were heating up. I didn't think it a good idea to raise my children in an environment where race was an important issue. In addition to which, I wanted to do some graduate work in physics. Or at least some electronic engineering, but preferably in physics. Having children and having to support them limited your opportunities for doing that in South Africa. They had no part time training in that regard. So England was a thought. The problem in England is to support two children and a wife and do your school was for me an impossibility. I never had private resources to do that. But my wife found-- recognized from reading in the newspapers about the big dearth of electronic engineers in the United States. They were sending over recruiting teams to Europe to try and hire people. Of course there was an explosion in the electronic business in the United States. So she encouraged me to find out about that. I was a member of the American Institute of Electrical Engineers and there were advertisements in there. I didn't pay too much attention to those because I think of advertisements as not telling the things like it is. I met with the cultural attaché of the American embassy who, after we met, encouraged me to go to the United States. And I met with some other individuals who did graduate work both at MIT and some other places. And one thing led to another, so we decided to emigrate to the United States for two reasons: One, to find a better social environment for my children to grow up in and for me to do some advanced work in electronics or physics. And then I came here.

Hendrie: And that year was--

Ringer: 1957.

Hendrie: Okay. And so what job did you find? Where did you end up? How did you manage to combine these two?

Ringer: My wife had relatives living here on the West Coast. We thought we should go to the West Coast for a couple of reasons. She had those relatives, which is very common with immigrants, to find areas that they are comfortable with. And secondly, there was supposedly an explosion of requirements for electronic engineers and they assisted you in going to college. Came to the West Coast and discovered unfortunately that we were just on the trailing edge of the McCarthy era, and if you weren't an American citizen, over 90 percent or thereabouts of the dollars spent on development in electronic engineering was government, and they required either American citizenship or security clearance at certain levels, and while a number of companies that I interviewed wanted to hire me, I couldn't get past the security thing. Because coming from overseas, getting security clearance could take as much as two years and they couldn't support somebody sitting around for two years doing nothing. I had come via Massachusetts. I had a cousin in Boston, in fact, lived in Newton. And while I was offered an assistantship at MIT, the salary was not sufficient to support a family, two children and a wife. And I got to hear about a company called Datamatic that was not doing military work, that was commercial computers, and I went in for an interview and I got a job there. Datamatic was partially owned by Honeywell and Raytheon. Honeywell, 60 percent and Raytheon, 40 percent. And within a year afterwards that I had joined them, Honeywell had bought out Raytheon.

Hendrie: So what was Datamatic working on and what part did you play?

Ringer: The major thing they were working on was the Datamatic 1000, vacuum tube computer, in fact I've got one of the gates of the-- vacuum tube computer. At that time the solid state devices, transistors, were just coming into being. They'd gone through point contact transistors, which were too unreliable. So that the junction transistor was now available, and they were beginning to get into that; that was the future. Not sufficient development work had been done in order for them to be secure that they could build a major computer out of these devices, but they started off and the first solid state controller for the Datamatic was going to be a paper tape to magnetic tape converter. It was going to interface with this Datamatic, but it was all going to be a solid state device. So I was in the department called Advanced Development and Research. And we built that controller.

Hendrie: Was this a stand alone device that translated paper tapes into magnetic tapes?

Ringer: That's correct.

Hendrie: It was not connected directly to the Datamatic?

Ringer: No. The connection was via the tape. Of course, in any case, the processing was done on the tapes.

Hendrie: It was a tape based computer? So, it was fundamentally getting input data that had been keyed into things like Flexowriters?

Ringer: They converted the paper tape into magnetic tape, and then took the magnetic tape for input to the diode computer. That led to some other things, so we developed and built an industrial control computer. Honeywell had a lot of electronic control businesses, and the intelligence was in little controllers for different aspects of the system. So at that time there were a couple of companies. RCA was one; I think Univac was another one that was building industrial control computers.

Hendrie: Yeah, GE built one.

Ringer: That's right. Really few. Small number. And we built one, developed and built one, where the active devices were solid state, and the arithmetic and logic devices were done by magnetic cores, which was pretty unique at the time. And we successfully built, and I worked on that one from scratch, the first process controller for Philadelphia First Electric.

Hendrie: Did this computer that you were working on have a model number eventually?

Ringer: Yes.

Hendrie: What was it?

Ringer: It was the H-290. Honeywell 290.

Hendrie: But it was built for the-- was it process control people? Where were they located?

Ringer: They were located a couple of hundred miles from us in Philadelphia.

Hendrie: But they subcontracted to you to--

Ringer: Build the processor. And then we provided the processor, and they of course, they did the software, etcetera.

Hendrie: And the system integration.

Ringer: That's right. They did that. And that was Honeywell's first foray into solid state, but during that time they developed the large computer; the vacuum tube one was now being replaced by solid state. Now, these were discreet transistors and diodes, they never had multiple units on a substrata yet. That developed into a militarized version. There was military, army need-- they had a heli-hut where they put a computer in that communicated via radio communication to a drone – unmanned.

Hendrie: A fighter aircraft?

Ringer: No, unmanned. What do we call them now?

Hendrie: Okay, yes, an unmanned missile.

Ringer: No, an unmanned aircraft that traveled about 250 miles an hour but at lower altitudes, made it very difficult to detect, and it had cameras, regular cameras. It had radar, different sensors and then they had telemetry between that and the controller in the heli-hut, which was primarily this computer. And our job was providing a computer that could live in the environment of a heli-hut that was being transported within, you know, a few miles from the front line. And so it was dropped, not from height, but a helicopter would drop it, so that it still hit the ground, so that it had shock absorption design and others inside it, and the material in it had to withstand the temperatures of a heli-hut, no air conditioning provided.

Hendrie: So it was a rugged computer that had shocks--

Ringer: That's right.

Hendrie: Was this a product? Did this have a product number?

Ringer: That was the D-190. The H-190. The Honeywell 190.

Hendrie: Okay, so the 290 was done for industrial process control.

Ringer: And the 190 was on contract to the army with the intent of there being a lot of them. It turns out that it took years for the development of the army side of it, of the telemetry, etcetera, and by that time it evolved into another program. But the big thing about that was that people were trained to maintain it--the reliability was that good, that the first time they had a failure was something like a year or so after they first installed it, so that the maintenance people originally may not have been there, and those that were there didn't know enough because they didn't have enough experience. So it took them instead of, you know, 10 or 15 minutes to repair the thing, it took them quite a bit longer. But it was really viewed as a really good aspect because of the long time between failures.

Hendrie: Now this machine had a combination of magnetic logic and transistors?

Ringer: Yes.

Hendrie: Do you remember what things were done magnetically versus, you know.

Ringer: Well, the logic was done magnetically.

Hendrie: All the logic was done magnetically?

Ringer: That's right. There you had coils and where you'd have multiple sensors going through the coil. And when the coil was switched, you'd have drivers that would reset the coils in a certain position, they were switched and they'd put out signals, and you can build up logic--

Hendrie: Yes, all right.

Ringer: And the interfaces were solid state devices, transistors. Like the sensors and the drivers were both out of transistors.

Hendrie: Do you have any sort of pieces from either of those machines?

Ringer: Yes, up there.

Hendrie: We'll do a little show and tell after this.

Ringer: Okay. I hope they're still there. They've been there a long time. If you'll notice up there, you see that model of an impala, which is a deer, right on top of there. That's called a spring buck; that is a symbol of South Africa that they use in the sports and on the flag and what not. That's all built out of computer parts.

Hendrie: Oh, my goodness.

Ringer: At one time, Honeywell, one of its promotional activities was building different animals out of computer parts, lions, tigers, etcetera. So in South Africa, they took up this theme and they had an artist make and build a spring buck out of computer parts.

Hendrie: Well, the museum actually has a good size collection of those.

Ringer: From Honeywell?

Hendrie: From Honeywell. That's very good. I've seen some others; I haven't seen the spring buck.

Ringer: Yes, this is the only one that exists.

Hendrie: So you worked on the 190. You were doing mostly logic design when you were doing the technical work or circuit design?

Ringer: When I first worked on the 290, I did logic design. And interface, asynchronous interface. Interfacing peripherals with computers is done either through a synchronous system or an asynchronous system. When you have mechanical contacts and things to talk about, that's not synchronous with the clock on the computer. And those are from a logical point of view one of the complex parts because you don't get-- you don't know how many times the contact is bouncing and all kinds of things of this nature, and that was my specialty on that computer, my responsibility was-- on the first one, was the interface between peripherals and the processor. By the time we had the militarized come along, I was the project director of the program. So I wasn't directly doing anything but I got involved with design reviews and things of that nature.

Hendrie: So what happened next?

Ringer: What happened next? I briefly worked on Honeywell's next big foray, which was into the Honeywell 200, which was their first really mass production of processors. Where, you know, they built many hundreds at a time.

Hendrie: Was that machine designed to compete with an IBM product?

Ringer: That's right. I think, IBM's-- I forget the name.

Hendrie: Was it the 1401?

Ringer: That was after the 1401. IBM came out with a successor to the 1401.

Hendrie: Would it be the 1410?

Ringer: Could be, I don't remember. However, the Honeywell computer was designed to compete with it, which meant being able to take programs that were designed to run on that IBM computer and to just straight put them into this Honeywell computer and that they would run, except they would run faster, the system was cheaper. So what they were doing was taking the Honeywell system and offering the customer faster performance at a cheaper price. And they did very well with that. And I initially got into-- I was program manager for the magnetic devices; that meant memory, which at that time, the two challenging [aspects were (a) sensor circuitry. Data signals were caused by magnetically switching magnetic cores. Depending on their “set” state will produce a pattern of signals. Reliability requirements forced designers to operate within narrow boundaries. And (b) the sensor inputs are not clean on or off. However the difference between on and off although narrow had to be predictable. That meant very tight specifications for the magnetic cores. Meeting those specifications in mass production was very challenging. In addition, there were mag tape drives. At that time 3C’s--Computer Control Company appeared on the horizon.]

Hendrie: Okay. Tell me the story of how you heard about 3C's, how you were approached, how you ended up at 3C.

Ringer: I got a letter in the mail, like many letters, "we have a customer, a client that has an opening for this kind of experience;" they would mention the range of the salary and challenges of the opening. “We want you to have an interview with us," etcetera. And I came home one day and Betty said here's another one of those letters.

Hendrie: These are from headhunters, employment agencies?

Ringer: Yes. And I looked at her and I said, "This is interesting." And she said, "Why is it interesting? You've been throwing away things where the salary was much higher than this, why would this one be interesting to you?" And I said, "Because it's describing me. Pretty much down to the nuts it's describing me. I'm curious, I want to find out about it." So I called up and this head hunter said, "Yeah, I want to set up an interview with you with the director of engineering for 3C's. You've heard of 3C's?" I think I might have at the time. So I met the 3C's director of engineering and some guy who headed up the computer development and it all went off really well. And they made me an offer, right off. I went home, I was a little concerned, I was a little uncomfortable about leaving Honeywell, if that's how I decided. And I was a little uncomfortable with how easy it went. I had a very good relationship with the vice president of engineering at Honeywell.

Hendrie: Who was?

Ringer: Cap Smith. And I went to him and showed him the letter and asked his advice. He said, "It's your career at this time, I think you should take the job. But you need to insist on the finances being checked up quite a bit. Stock options plus salary." And he gave me a suggestion. Okay, I took this back with a great deal of trepidation and 3C's response was "okay." And that's how I got into 3C's.

Hendrie: Do you remember what year that was?

Ringer: That was about 1962.

Hendrie: And who were the two people, the head of computers and the head of engineering?

Ringer: The head of engineering, his name was Paul Bothwel. And the head of the computers was Fritz Niemdeler.

Hendrie: Fritz Niemdeler?

Ringer: Yes. A Dutchman. And it went very smooth, which worried me, but also I noticed, of course, the facilities at 3C's, the equipment, wasn't as expansive and as expensive as it was at Honeywell, which also made me a little uncomfortable. But I took the job. A couple of years later I found out what really happened. Cap Smith was in charge, was vice president of engineering at Raytheon when they developed a computer under contract for the navy. When that contract ran out, Raytheon wasn't interested in developing a product line; they were only interested in responding to a special purpose

contract, because that was their business. The people working on that computer were all entrepreneurial in a technical sense and they wanted to work on the next one, the next level. So a certain number of them left Raytheon and formed 3C's. And they were offering components for building systems, the others eventually became-- since Raytheon was looking to get rid of it. Honeywell was looking to acquire. Honeywell wanted to get into the computer development business and it's either start from scratch with a lot of investment or use that money to buy what exists. They decided to buy. And therefore Raytheon and Honeywell joined, with Honeywell being the major partner and Raytheon being a short term partner. Subsequently Raytheon, after the thing didn't turn profitable within a year or two, whatever it was, Raytheon wanted to get out of it and Honeywell bought them out. Then it became a hundred percent Honeywell. The vice president of engineering at Raytheon was Cap Smith. And he became the vice president of engineering for the Honeywell division, of Datamatic. The guy who was president and the owners of 3C's, used to work for him. And when 3C's decided they needed somebody with experience in developing and manufacturing computer systems, it was difficult to find in those days. One of the ways they did that was they got hold of Cap Smith. "Do you have anybody?" And he recommended me. But it's all on the QT. he thought that that was a good deal for me, and it would be a good deal for 3C's. and he was a real fine person, and he thought it was a win/win situation, but I wasn't supposed to know anything about this. And I found out by, I forget who it was that told me, it may have been Cap Smith that told me, so then it made sense.

Hendrie: You found out later and then you realized why this all went so easy.

Ringer: And when he told me this is the kind of money you should be asking for, I am sure he had called them up and said, "Hey, yes, but this is what the guy's worth, not what you offered him."

Hendrie: And so they had already--

Ringer: Yeah.

Hendrie: Isn't that interesting. That's a great story. So you get to 3C, what are your initial responsibilities?

Ringer: They had a computer development going on and it was called-- was it the 124--

Hendrie: I'm thinking it was the 224. I'm guessing it was, because they already had the D24. hadn't it been designed out on the West Coast and then they moved computer projects to the east coast?

Ringer: I think something like that happened.

Hendrie: Yeah, some sort of political battle.

Ringer: The thing that confuses me a little bit now is I came out to the West Coast, had a meeting with the guy who was the vice president running the 3C's West.

Hendrie: Was that Admiral Waller?

Ringer: No.

Hendrie: Or Finali?

Ringer: That could be, yes. And they were pushing to have a computer development. The people on the East Coast were saying, "We don't want to take that big gamble, putting all that investment in. If we get a contract, it's one thing, but putting all that investment when we are doing well with the things that we were doing, selling components and subsets--" and the guy on the West Coast goes, you know, "this is the future," and then eventually-- but I was already in 3C's when this happened, and then they moved, they said okay, we'll do that, but we're moving it to Framingham. And when I came in there, the development of a computer was underway and they asked me to become the program manager for that.

Hendrie: And this is going on in Framingham?

Ringer: Yes, that's right. And they were developing a general purpose computer to be sold-- however, what they-- they were doing it the way they were used to doing it. They were not developing a computer that you can negotiate with marketing, you're going to get 100 or 20 or whatever it is this year and develop a customer base and purchase and do everything. They were developing them one at a time. And they realized, the top guys, Bothell and Ben Kessel realized this is not the way they're going to be able to succeed and they wanted somebody that had the experience.

Hendrie: Developing a product?

Ringer: Yes. This is a system. And that's what I inherited. But shortly after I inherited that, a new-- two systems was invented. One was the 116, that you were the program manager of, and the other one that I was the project manager of, using the same hardware, same circuit boards, same hardware, if you remember.

Hendrie: Yes.

Ringer: And wasn't that the--

Hendrie: That may have been the 124.

Ringer: Yes, that was the 124 and yours was the 116.

Hendrie: Right. And I remember Kenneth Bickey <ph?> was the logic designer for--

Ringer: He was one of the logic designers.

Hendrie: And Armond Clutier <ph?> worked on it.

Ringer: On the 124?

Hendrie: Yes.

Ringer: And Dean.

Hendrie: Frank Dean?

Ringer: Frank Dean carved out the certain logic that he was doing.

Hendrie: Okay, so he was part of that.

Ringer: Logic and hardware.

Hendrie: Yeah, because he was one of the founders of 3C's.

Ringer: That's right, but couldn't stand upstairs and wanted to be in amongst the engineers. Very nice person.

Hendrie: Yes, we actually have his oral history at the Museum now.

Ringer: Yeah.

Hendrie: All right, so tell me some stories about the development where you were responsible for these 24-bit machines?

Ringer: You're talking about the 124?

Hendrie: The 124 or the finishing of the 224. I think you were there at the completion of the 224.

Ringer: That's right.

Hendrie: It may have been started but you were there.

Ringer: That's right. The 224. When I got there, the 224-- they hadn't built, put it together yet, it was still in the logic design phase. The 124 came about a bit later. I don't know what I can tell you. It was hectic, a very enjoyable and exciting period.

Hendrie: Do you remember what the principal applications were for the 224, the 124? The way they sold them?

Ringer: Depends on the where the marketing guy got up-- which side of the bed in the morning-- where he went to. There wasn't a very formalized marketing strategy. There was an informal strategy, but not a formalized one as I saw it. The customers were like NASA; we had the missile program, the Saturn. There were two aspects of it. One was the engines were tested out in Slidell and one of the processes, a couple of them, went to Slidell as the controlling testing, sequencing testing of the Saturn engines. Slidell, in Mississippi, I guess, is where it is. Is that right? No, no, it's Texas. I don't know.

Hendrie: Alabama. I think so, near Huntsville?

Ringer: No, no. Huntsville is where they did the original development, but as the engines got stronger and stronger, the audio vibrations got worse and worse and they had to move. And they moved to the swamp area of Louisiana called Slidell, so that the swamps could absorb that sound energy. But we did develop a processor for the countdown sequencing of the Apollo program. The actual contract was awarded through RCA, I believe. I think that had to do with costs, price. But it came-- I think what happened is that it never could handle the load or the timing or whatever it was, but the RCA one couldn't do the job. So they came to us and said, "How about you taking this on?" Because when they did the evaluation, I think technically they were very happy with us. Maybe it was twice, I don't know. So we provided that. You know. I think they worked in tandem or something; they didn't want to disturb RCA.

Hendrie: I believe, if my memory serves me correctly, that the RCA computers were actually in the bunkhouse underneath the missiles and did the direct-- had all the instruments, all the temperatures and the pressure gauges and everything, those were all connected to the RCA computers, that did the scanning and sort of the basic data collection, but they were not powerful enough to drive all the displays that were needed and all the things in the-- where the countdown was, and so that data was then shifted to--

Ringer: The 124.

Hendrie: Yes, to the 3C machines, that then drove all of the displays and then did the further processing of all the data.

Ringer: Initially one processor was going to do all.

Hendrie: Really?

Ringer: That's right, that was the contract. And then they came back and said, "Look, the RCA machine can't do it all." And that, I don't know if I want this on the tape or not, but I think the RCA device if it was replaced by the Honeywell device, the 3C device, could have created quite a political problem. And I think we were asked to put in the 124 and keep the RCA there even if all it was, was a channel. And I think that's what happened.

Hendrie: Yeah, that makes sense.

Ringer: One of the interesting things-- although this is 3C's we're talking about-- the 190, the Honeywell 190, the heli-hut device.

Hendrie: Yeah, you can go back to that. What about it?

Ringer: That's interesting. The army was wanting to give an award. The major, the prime contractor, was here in California, Aerojet General. Aerojet General was about to announce the award to the 3C computer that was competing with the 190, I don't know what that was. That may have been--

Hendrie: It may have been a DDP-24 at that time.

Ringer: I don't know.

Hendrie: Could have been.

Ringer: But it was competing with the 190. And the 190 had 18 bits; the DDP-24 had 19 bits.

Hendrie: Oh yes, it was the DDP-19.

Ringer: Yes. And they used the 19th bit for a check bit. At any rate, they had done an evaluation and the prime contractor for selecting the computer was ITT, stationed in New Jersey. And they were wedded to 3C's, marketing did a very good job. Our marketing was very casual on this, they were located here on the West Coast; the decision making was on East Coast, and they were about to award it to 3C's when-- I lived in Massachusetts at the time and a friend called and said, "Look, on Monday there's going to be a decision made. I don't know if we can turn it around. Our information is they're going to award it to 3C's. The only thing that we can do here to turn it around is shoot down the 3C's capability completely. The one that we had. So we want Morrie Ringer to come out here and bring with him whoever he wants to. We can't assure you that we'll get it that way, but we can assure you that if you don't, you won't get it that way." So the VP Marketing in Honeywell, his name was Smith, not Cap, but another Smith, woke me up on a Sunday morning and told me the story and said, "I think you'd better get your ass over there." So I called up Burt Cohen <ph?> who was working on the program and I said, let's go to the West Coast on

Monday morning. We got reservations, we were picked up at the L.A. airport about eleven or twelve or something, taken straight to Aerojet General and there the decision making honcho came into the room and said, "You guys wanted to know the evaluation. Well, we've decided to go with 3C's." I said to him, "Why?" He said, "We had five criteria-- eight criteria for selecting the computer." And so he had a big chalkboard and on it he put down these five criteria and he put down 3C's and Honeywell. And on four of them they had 3C's getting a higher grade than Honeywell. And I said I don't believe that's correct. So we went through each one of them, and we were better on every one except they had 19 bits and we had 18 bits. So I said to them, "Look, if you do the statistical analysis for error, the error rate for the devices, etcetera, if you add on the extra bit you can demonstrate that the unreliability introduced by adding it on will offset any disadvantage of not having that. In any case, we have processors sitting around here of 18 bits, we don't know of a situation that would have done better if we'd had a 19th bit; there are other ways of checking it. But if you want that extra bit, we've got it, we'll put it on for you. So if you want it fine. At no cost to you. The guy says, "hmm." So I said, "Now, if you look there, we tie on one and we beat them on four. I don't understand how you can award them the contract." The marketing director for California was kicking me in my ankles, "You can't talk to a customer like that," and I said, okay. So the guy says, "Okay. It's near lunch time, I'll go back and check this with people and I'll come back here." So I said, "Well, we're not that hungry, we'd rather you do it now." So he went through, and he said to the guy-- the guy who was the chief technical guy, "What do you think of this?" He said, "I've been telling you guys that for months. The Honeywell was a better deal, but nobody wanted to listen to me, I'm the technical guy sitting in the back." Well, that's because our marketing people didn't do their job. Anyhow, so the guy said, "Okay, we'll award you the contract. You go have your lunch and come back and we'll have it done." I said, "None of us are hungry. We'll sit here until you can get that thing signed off." He walked out of the room, was gone for about 15 minutes, came back and gave us the award. Now, that was a very satisfying experience. We walk out of there, the marketing director for California gets on the phone, calls the headquarters in Wellesley and tells him we got the contract. Oh, this guy was so excited, because this was a symbolic thing.

Hendrie: Yes, very symbolic.

Ringer: So he says, let me talk to Morrie, gets on and says, "Well, Morrie, what you going to tell me?" So I said, "Vini, vidi, vici." And he knew it, he understood it, which for a marketing guy was unusual-- anyhow. So he says let me talk to the marketing guy. And I hear through the phone, this is in a callbox, "You take Morrie out to dinner and you give him anything he wants." That was very interesting, that was a very good experience. And we delivered that thing on time and on schedule, which is an unusual thing in that business, at the time.

Hendrie: Did they ever take you up on adding a 19th parity bit or anything like that?

Ringer: We put that bit in but we never connected it. On each circuit board, we just added that one amplifier on the end. And left it there. And that system ran for over a year without a failure.

Hendrie: Yes, exactly. It's all about worst case design, not about how many bits.

Ringer: Yes.

Hendrie: Very good. That's a great story.

<Break>

Hendrie: All right, we're back with Morrie Ringer. Let's see, we had left off when you were at 3C. You were at 3C before it was bought by Honeywell. Do you remember anything about the transition when Honeywell purchased 3C?

Ringer: Yes. At the time that Honeywell was negotiating the purchase, I was still at 3C. And what's the guy's name that headed up the Honeywell computer business at that time?

Hendrie: Walter Finke.

Ringer: He was being taken around the plant by what was the president of 3C again?

Hendrie: Ben Kessel

Ringer: Ben Kessel. And Spangle and this guy was being taken around the plant, ostensibly because Honeywell's top management was going to visit all of the customers who have a computer at least this size. And 3C's had a Honeywell processor for their accounting business. So that's the reason. The actual reason was they wanted to get a tour. So they're walking around and then Ben Kessel comes to the section where I'm in, and introduces me to this guy-- what's his name? Anyway, introduces me to him and the others, so this other guy says to Ben Kessel, "What do you mean, do I know Morrie Ringer? Why do you think we're buying this joint?" You know, it was a joke. And he knew me very well. And so I was there at that time. And I was there, still there before Honeywell bought it, sorry, after Honeywell bought it. It wasn't a long period of time. That's when my discussion about whether I was going to move to Framingham or not from San Diego. No, no, no, no. Sorry.

Hendrie: When you left 3C division of Honeywell, then you went to be chief engineer at Honeywell in San Diego.

Ringer: Yes, I was director of engineering there.

Hendrie: So that's a different thing.

Ringer: So when I was there, at the time that Honeywell was acquiring, I was still at 3C's and I remember a meeting in the conference room upstairs where Toby Harper <ph?> and one or two others of the top management at the Philadelphia, in Pottstown [Philadelphia], process control thing, came to give us a talk because Honeywell is acquiring them. They were merging.

Hendrie: Yes, they decided to merge the computer operations in Pottstown with Framingham, yes.

Ringer: With Framingham. So there was these discussions and the purpose was obviously to have an exchange of backgrounds, etcetera, but it got a little out of hand when one guy was talking about the experiences of they went in to automate, what's the name of the cake manufacturer?

Hendrie: Oh, Sara Lee.

Ringer: Sara Lee. So conceptually, it's very easy. The oven door's open, there's a switch, the oven door is closed, there's a switch, you put in flour, there's a timer that measure-- you heat it to this, you put it on trays-- conceptually very simple and straightforward. But they found out that in practicality it was a hell of a big difference. When some of the dough spills over onto a switch that wasn't designed to let-- or when the temperature on the door goes in 20 or 30 degrees higher than anticipated, what happens to that switch on that door? And they were something like two years late in bringing that Sara Lee thing on line because it had a lot of these bugs that had to be worked out. And, you know, he was giving that experience, and Toby was very embarrassed about this and didn't think that was a smart thing for the guy to say. But the guy said, "Hey, we're all in the same bed now, why not?" There was in Honeywell, when I first got there, the D1000. All of the wiring was done with-- what was this thing called?

Hendrie: Oh, wire-wrap.

Ringer: Handguns. But then the manufacturer of this device had both an automated-- Honeywell said oh, they could put these back panels, the big ones, on the board and the thing would just run automatically, wire everything.

Hendrie: Yes, the Gardner-Denver machine that was called.

Ringer: That's right. There were some problems of course. Because anticipating which way the lines have to go, it's got to go from there to here, and they should very specifically tell the machine that it should go along these lines. It can tell the shortest route or the one most convenient at the time and from a noise suppression point of view that may not be the way the wire should be going. So they had all of that and wire breakages. And in fact it took nine months longer to bring them on board than they should. And I used to go to this plant down at Soldier Field's Road in Boston, where this thing was being developed, and the girls, women, who were using wire-wrap guns were in the same room where they were trying to debug this Gardner-Denver machine. And week after week, the girls used to come in there and laugh and tell these guys, you're never going to get that damn thing working. And then all of a sudden one Monday morning, I came in there and there was not a single woman. The machine had taken over. I think there must have been-- I don't know, 50, 60, 100 women. And not one.

Hendrie: It had finally passed all of its qualifications and they had put it into production.

Ringer: Yep. Which is sort of a metaphor for a lot of things that happened in the industry, you know. Anyhow, I left Framingham, as I told you, when I was offered this, in a round about way, director of engineering in San Diego. And I was there for four years.

Hendrie: I'd like to cover just a couple of things at 3C before we get into that. I believe you were there when the 632 computer, they started developing the 632. Could you tell me what you recall about how that got started, what the genesis was, any issues that went on with that machine?

Ringer: I was initially the program manager for it. The way it got started is that-- I think this was the 224, 124, the 124 was completed, the design and development was complete. And we were now talking about what the next generation would be. You were fooling around with the 116 that became the five-- what is it? 516.

Hendrie: Yes, we did the 516, the 416.

Ringer: After the 116. And that was going to the lower end. And then there was a question of pushing it up to the higher end, and that was the birth of the 632 and a couple of systems engineers, Woods was one of them, that drew up the system design for the 632?

Hendrie: John Fong?

Ringer: John Fong as well.

Hendrie: And who was the other one you said?

Ringer: Woods.

Hendrie: Oh, Bill Woods, yes.

Ringer: Bill Woods. And that went on very well. It was-- I remember building the prototype when the issue really became what's the good of this machine without software. You can sell a small machine without software because the user is going to use rudimentary software to use it, he's not going to have sophisticated software. You have a large powerful machine like that, if you want to get the benefit out of it, you want to apply it to applications and where you can use it, it requires some sophisticated software, in that competitive market. The marketing people were hell bent as was Bothwell and company, hell being on the 416 and 516 approach, that's where the energy and the budget money went. The people in England, I went over to England to give them a presentation of our product line, they couldn't get off demanding "when are we getting the 632; we've been promised this thing. Where's the software packages? We've got several very interested customers. All we've got to be able to do is give them some committed dates and committed software." And they were very disappointed and it was quite obvious to me by that time already that 632 is not going to get the software support and I think the 632 just died on the vine.

Hendrie: It just did not have enough support. I know some machines were shipped.

Ringer: Yeah, but they didn't have the software that they should have, so the user had virtually to develop his own software. And if you're competing in a market where the user is getting software supplied, maybe not everything they want, but compared to getting nothing, there was a big difference.

Hendrie: Well, the machine certainly was supposed to have a big virtual operating system; as I remember it had paging and segmentation. It had lots of high end features, but I'm not sure if even the operating system ever got done.

Ringer: I don't think so.

Hendrie: So that was just a product that didn't have enough support?

Ringer: I don't think that product had enough support from the day it started. I think that product was viewed as something you have when you're trying to sell your operation or get it merged with something.

Hendrie: Was that product started before Honeywell bought the thing? I don't remember the exact dates. But you left in 1967? Right? You left for San Diego.

Ringer: In 1968.

Hendrie: Okay. And I think the 3C was sold in--we're getting a battery alarm. Okay. I guess we have to pause.

END OF INTERVIEW

