An Interview with
HERMAN GOLDSTINE -- OH 18
Conducted by Nancy Stern on
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Charles Babbage Institute
The Center for the History of Information Processing
University of Minnesota
[excerpts]

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STERN: Can you give me some information on the Selectron?

GOLDSTINE: Yes, the selectron tube? Right. The thing that RCA was supposed to contribute to the project was memory tube. Rajchman -- Jan Rajchman -- you've probably got his name--worked under Vladimir Zworykin at RCA Research in Princeton. Zworykin and he decided at the beginning that it would be best to store information in the phosphor of the cathode ray tube. (You store a charge.) They decided that it would not be wise to try to switch the beam to a given point by analog circuits which is the way a television set does. But that instead, you should put into the cathode ray tube a grid which had 4,096 windows, all of which were available. They ultimately cut it down to 512 or whatever the size was that they finally arrived at--windows. One and only one window could be opened at any one time. The way the beam worked was that it just sprayed electrons out, more or less hitting the whole wall, the whole wall being filled with windows, and trying to go through whatever window would let the current go through.

The beam therefore could only go through whichever window was open. Now, that was the concept.

The windows were opened by suitable electrical impulses on each of two wires, and were closed by the same mechanism. It was a very neat idea, but it involved--let me just think now how many -- well, it was 64 -- you had to have 64 by 64 -- if you had 4,096. And 64 is 2^8 -- so you had to have 8 wires coming in for one direction and 8 wires for the other.

STERN: It's 2^6, I think.

GOLDSTINE: I'm sorry -- 2^6. You had to have 12 wires coming in to do the switching. As I understand it the problem of doing this with the technology available at the time to Rajchman was just too big a deal. In those days they just couldn't bring that many wires -- 24 wires out of a bottle, without having contamination and all sorts of problems. That wrecked them. Concurrently, Freddie Williams in England was busy doing much the same thing by analog switching, and that was the difference.

STERN: You would think that RCA would have opted for the analog switching.

GOLDSTINE: Well, they made the initial judgment that it was not safe, and that it should be switched digitally and that's what killed it.

STERN: How many people worked on this project?

GOLDSTINE: With Rajchman? Rajchman and Snyder were the major figures. How many subordinates they had, I've no idea. But there must have been a crew of technicians.

STERN: There's, again, a letter in the file in which von Neumann said that he believed if George Brown--is that his name? -- had stayed on the project it might have been a success.

GOLDSTINE: Well, I think von Neumann was wrong on that. George Brown is a mathematician, or a statistician, who left the project and went from Princeton to UCLA. It was Brown who worked out the switching arrangement for the tubes and he's very bright. But I don't think he knew a single thing about the engineering of the tubes, and I don't think that he would have succeeded in doing anything. In my opinion it was Rajchman who was the brains of the engineering.

STERN: Now, how long did it take before they realized that the concept was not viable?

GOLDSTINE: Well, it isn't totally fair to say that it didn't work, because the RAND Corporation built a computer and used those tubes in it.

STERN: At what point was the decision made to opt for the Williams tube?

GOLDSTINE: More or less as soon as we heard about the Williams tube.

STERN: Can you recall when that was--approximately?

GOLDSTINE: I would make a rough guess it was 1950-ish. Oh, incidentally, I suggest for things about this you might want to call Jim Pomerene. He's at IBM Research in Yorktown.

STERN: Which reminds me -- Jule Charney -- is he still at Princeton?

GOLDSTINE: No, Charney and Phillips both went to MIT. Phillips still works at MIT, but I think he's now a part of the Weather Bureau. Smagorinsky can tell you.

STERN: Okay. There's reference to two types of Selectrons. A sandwich type and a quadrant type.

GOLDSTINE: Well, I don't remember the details anymore about that, but those were different geometries to try to make the thing work. I don't remember more. The one I remember best, I think, is the sandwich. But this had to do with how the grid was put in there--that had the windows in it, and it's not very important. But Rajchman lives in Princeton--he's retired. You'll find him in the phone book, and you could interview him.

STERN: We have an interview scheduled for Wednesday.

GOLDSTINE: Okay, fine.

STERN: I'll speak with him about that. What was the relationship between the Computron -- RCA's Computron -- and the Selectron?

GOLDSTINE: The Computron was something that Rajchman and Snyder had worked on. Rajchman and his colleagues started very early working on electronic counting and comparable things. They had the idea of building special-purpose vacuum tubes, which was their big thing, to do fairly complicated things, such as adding. I think the Computron stepped up from 1 to 10, or 0 to 9, or however. So it was kind of an adding tube. Instead of doing this by a whole series of flip-flops, they chose to put it all in one envelope. That was the big thing that RCA could do. None of this was a success. These were all attempts to carry electronic computing in the direction of special-purpose devices, which could be achieved by a master of the vacuum tube technology, and they all failed, because the thrust went in the other direction.

STERN: So Synder was in RCA working on a computer project for some time?

GOLDSTINE: Right.

STERN: What made him decide to go to the Institute? It seems like an unlikely choice.

GOLDSTINE: I don't know that he was very happy, I don't think he was a very happy person. He was obviously eclipsed by Rajchman at RCA. Rajchman was clearly better, senior to him, smarter than him, etc. And I think he was unhappy at RCA. Then I think he was unhappy at the Institute. I don't know what happened to him then. At any rate, that was his career.