Jan A. Rajchman

Born August 10, 1911, London, UK- died April 1, 1989, Princeton, N.J.; RCA inventor of the Selectron, which was used in the JOHNNIAC as the memory system; inventor of the basic concepts of core memories.

Education: DiplEE, Swiss Federal Institute of Technology, 1935; DSc, Swiss Federal Institute of Technology, 1938.

Professional Experience: Radio Corporation of America: student engineer, Testing Department, 1935, member, technical staff, RCA Laboratories, 1936-1958, associate director, Research Systems Laboratory, 1958-1961, director, Computer Research Laboratory, 1961-1967, staff vice president, Data Processing Research, RCA Laboratories, 1967-1969, staff vice president, Information Science, 1969-1976; Mackay Professor, University of California, Berkeley, 1976-1977; consultant, 1977-1989.

Honors and Awards: Levy Medal, Franklin Institute, 1947; Liebman Award, IEEE, 1960; Edison Medal, 1974; Harold Pender Award, University of Pennsylvania, 1977; member, National Academy of Engineering; fellow, American Physical Society; fellow, IEEE; fellow, American Association for the Advancement of Science; member, New Jersey Inventors Hall of Fame.

Born in London, England, where his father was engaged in medical research, at the age of 7 Rajchman returned with his parents to their native Poland, and three years later to Geneva. He graduated from the Collége de Genève in 1930, and in 1934 obtained the diploma of electrical engineering from the Swiss Federal Institute of Technology in Zurich; in 1938 he graduated from the same institution with a doctor of science degree.

He emigrated to the US in early 1935, hoping to do research at the RCA Laboratories. After a summer at MIT, RCA employed him in the Testing Department, where he matched the variable condensers for superheterodyne radio receivers to standards, by bending plates by hand. In January 1936 he joined Vladimir K. Zworykin's laboratory in Camden, NJ.

His first research was in electron photomultiplier tubes, to which he applied electrostatic rather than magnetic focusing. The determination of the electron trajectories in the fields of complex electrodes was beyond the computational capabilities of the day, and he resorted to modeling the electron paths by rolling small steel ball bearings on stretched rubber sheets. He designed an intricate system of dynodes to keep gas ions from feeding back to the cathode, which removed the main causes of dark current that set the lower limit of light detection for these phototubes. His designs, which formed the basis of his doctoral thesis, are still the mainstay of present-day multipliers.

At this time Rajchman made informal suggestions to many particle and radiation physicists that they could make a detector out of a sealed-off photomultiplier by putting some phosphor on its face. Thus, he is probably the father of the scintillation counter.

During World War II the laboratory was asked to work on the directors for anti-aircraft guns, using electronic digital systems. The first work was to develop counters, shift registers, and arithmetic units. Under Rajchman's direction the laboratory developed a vacuum tube capable of binary arithmetic, which was dubbed the

"computron." A second invention was the function generator, consisting of a large matrix of resistances, which created what would now be known as a read-only memory. The capability for building a complete computer existed, but the laboratory turned down the opportunity to build one, fearing the lack of reliability of the large number of vacuum tubes involved. Rajchman then spent some time consulting with the Moore School at the University of Pennsylvania, transferring much of their know-how to the developers of the ENIAC.

In 1946 John von Neumann asked RCA Laboratories to assist in the development of a memory for the IAS machine. Rajchman developed the selective electrostatic storage tube, which represented the first truly digital, random-access high-speed memory. The storage capacity for each tube was 256 bits. Later Rajchman began to look at magnetic devices, and conceived of the use of the hysteresis loop of toroids as a memory system. The cores were squeezed into shape using a converted aspirin tablet press. Jay Forester and the group at MIT (including An Wang) achieved a similar result and eventually got into a patent dispute with the RCA Laboratories. The early core memory matrices contained 10,000 bits, which Rajchman termed a myriabit.

In 1961 Rajchman became director of the Computer Research Laboratory, but eventually RCA departed from the computer field and Rajchman, after spending a year at UC Berkeley, became an independent industry consultant, continuing to make inventions and receive patents.[1]

QUOTATION

"I have experienced the great thrill in conceiving an idea and actually implementing it myself, a thrill that I imagine inventors share with artists." (Rajchman, 1973 interview)

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[1] Based on Weiss 1989 and the interview by the staff of the *RCA Engineer,* 1973.

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UPDATES

Portrait added (MRW, 2013)