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**Computer Oral History Collection, 1969-1973, 1977**

**Interviewee:** Vincent Neisius
**Interviewer:** Robina Mapstone
**Date:** March 1973
**Repository:** Archives Center, National Museum of American History
**Description:** Transcript, 59 pp.

**Abstract:** Neisius, born in 1917, became a teacher at Georgia Tech and consultant at the Georgia Power Company. He was an advocate of Charles A. Stephenson's methods for analyzing transportation fare structures. Stephenson asked him to join Axel Wenner-Gren's Alweg Transit Research Company to make plans for purchase of the Long Island Railroad. Meanwhile, Glenn Hagen persuaded Wenner-Gren to finance a computer company headed by Hagen and staffed by people from the Northrop computer division that had been purchased by Bendix. When Wenner-Gren decided not to buy the Long Island Railroad, Neisius was sent out to review computer designs at Hagen's company, Logistics Research. Neisius wrote programs for the Axel Wenner-Gren Automatic Computer (ALWAC) which was demonstrated as a fully operational computer at a June 1953 conference in San Francisco only 8 month after the decision to build a computer was made. He describes the rapid construction, the reliability, the memory channels, and the interactive demonstration routines of the ALWAC I. After this machine sold in 1955, Neisius delivered the ALWAC II to the David Taylor Model Basin and impressed the Weather Bureau with the powers of the machine. Several years later there was an attempt by other Wenner-Gren employees to remove Glenn Hagen. All employees, who favored the revolt, were fired (including Neisius). The employees who left joined the J.B. Rea Company. Some months later, Hagen won the political battle and was given full control and one year to sell the company. Hagen was asked to rehire all of the employees, but he only rehired Neisius as marketing manager. Approximately a year later, Hagen was fired from Logistics Research and replaced by Sir Robert Watson Watt and Neisius became Executive Vice President. After another year, and a political battle, Neisius lost his job and went to J.B. Rea Company to program the READIX and become the computer sales manager. This computer, designed for Navy submarines, was unusually easy to program in machine language. Marketing problems of the READIX led Neisius to join Hagen's new firm, Systematics. He later went to Packard Bell and then TRW. Neisius comments on Hagen's work on the floating head, on

a 1955 conference at which an ALWAC was operated from Boston via teletype, on the later fate of the Alwac Corporation and J.B. Rea Company, and on the early careers of Sir Robert Watson Watt and J.B. Rea. In addition to Watt and Rea, Glenn Hagen, Bob Hoffstrom, C.A. Stephenson, and Axel Wenner-Gren are mentioned often in this interview.

**Citation:** Computer Oral History Collection, Archives Center, National Museum of American History.

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**Computer Oral History Collection, 1969-1973, 1977**

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|---|---|
| **Interviewee:** | Eldred Nelson |
| **Interviewer:** | Robina Mapstone |
| **Date:** | October 17, 1972 |
| **Repository:** | Archives Center, National Museum of American History |
| **Description:** | Transcript, 42 pp. |

**Abstract:** After working on the atomic bomb project at Los Alamos during World War II, Nelson formed a partnership with Dr. Stanley Frankel, and as part of a contract with Northrop, they both worked on the development of the Magnetic Drum Digital Differential Analyzer (MADDIDA). In 1948, he joined Hughes Aircraft Company and worked on DIGITAC, a tactical bombing system designed to perform navigational and bombing calculations. He also helped in the design of the MXll79 and a prototype commercial computer. When the Hughes Company decided against continuing computer work, some employees left to set up companies of their own, and in 1954 Nelson joined one such company, Ramo-Woolridge Corporation. He studied the generalization of the technology of airborne digital computers into an industrial process system and delivered an important paper on the subject at the meeting of the Institute of Management Sciences in 1955 or 1956. He discusses the east coast/west coast differences in computer design and operation, including the smaller size of west coast computers, and their earlier use of Boolean algebra. He traces the development of TRW through its various names. Nelson was still with TRW at the time of the interview. Names often mentioned include Dr. Stanley Frankel, Montgomery Phister, Floyd Steele, and John von Neumann.

**Citation:** Computer Oral History Collection, Archives Center, National Museum of American History.



**Transcript:** http://invention.smithsonian.org/downloads/fa_cohc_tr_nels721017.pdf

**Computer Oral History Collection, 1969-1973, 1977**

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|---|---|
| **Interviewee:** | G. Neovius and Pollmeyer |
| **Interviewer:** | |
| **Date:** | August 1968 |
| **Repository:** | Archives Center, National Museum of American History |
| **Description:** | No transcript |

**Abstract:**

**Citation:** Computer Oral History Collection, Archives Center, National Museum of American History.

**Computer Oral History Collection, 1969-1973, 1977**

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|---|---|
| **Interviewee:** | John Northrop |
| **Interviewer:** | |
| **Date:** | July 23, 1968 |
| **Repository:** | Archives Center, National Museum of American History |
| **Description:** | No transcript |

**Abstract:**

**Citation:** Computer Oral History Collection, Archives Center, National Museum of American History.

**Computer Oral History Collection, 1969-1973, 1977**

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|---|---|
| **Interviewee:** | Max Palevsky |
| **Interviewer:** | Robina Mapstone |
| **Date:** | February 15, 1973 |
| **Repository:** | Archives Center, National Museum of American History |
| **Description:** | Transcript, 31 pp. |

**Abstract:**

**Citation:** Computer Oral History Collection, Archives Center, National Museum of American History.



**Transcript:** http://invention.smithsonian.org/downloads/fa_cohc_tr_pale730215.pdf

**Computer Oral History Collection, 1969-1973, 1977**

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|---|---|
| **Interviewee:** | R.D. Parker |
| **Interviewer:** | Richard R. Mertz |
| **Date:** | July 13, 1970 |
| **Repository:** | Archives Center, National Museum of American History |
| **Description:** | Transcript, 34 pp. |

**Abstract:**

**Citation:** Computer Oral History Collection, Archives Center, National Museum of American History.



**Transcript:** http://invention.smithsonian.org/downloads/fa_cohc_tr_park700713.pdf

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**Computer Oral History Collection, 1969-1973, 1977**

**Interviewee:** Robert Patrick
**Interviewer:** Robina Mapstone
**Date:** February 2, 1973
**Repository:** Archives Center, National Museum of American History
**Description:** Transcript, 73 pp.

**Abstract:** Patrick graduated from the University of Nevada in mechanical engineering in 1951 and entered the Air Force. Assigned to Edwards Air Force Base, he learned to use the Card Programmed Calculator (CPC) in classes at the University of California at Los Angeles. A CPC soon arrived at Edwards and by early 1952, Patrick was using it to reduce data from flight tests. In early 1954, he became one of four staff members of the computing center of Convair, running CPCs for the accounting department. When Convair acquired an IBM 701, Patrick went to New York City to learn to program the machine, working on a problem from the design of the B-58 Hustler bomber. Convair's 701 had to have wiring entirely resoldered on the spot; the machine was soon upgraded from 4000 to 8000 words. Some programmed in assembly language, but Patrick translated CPC programs into IBM's SPEEDCODE. Tired of military research, Patrick went to General Motors in 1954, working first with a CPC, then with an IBM 701 on calculations for gas turbine design. Assigned to set up operating procedures for an IBM 704, Patrick developed a 3-phase system of input, execution, and output that he described at a 1955 Society to Help Avoid Redundant Effort (SHARE) meeting in Boston. Owen Mock of North American worked with him, developing a system with different execution procedures. They produced the GM I/0 system and the North American monitor system. These were the basis of the SHARE Operating System (SOS) and subsequently the IBSYS (the operating system for the IBM 7090) and then the TSOS (the operating system for the IBM 360).GM used the IBM 704 to study springs and dynamics of automobiles, engines, gas turbines, and aircraft. It also was used to schedule inventories. Patrick worked on a classified project, the guidance system for the intermediate range ballistic missile Thor. He also studied magnetic tape controlled tooling. Patrick left GM for CEIR in 1958. The following year he, Roy Nutt, and Fletcher Jones started Computer Sciences Corporation. Working in the tradition of Grace Hopper, CSC set out to write an English-language based compiler, FACT, for Honeywell. Patrick also comments on the computer languages Common Business-

Oriented Language (COBOL), the Commercial translator (COMTRAN), and the Johnniac Open System (JOSS); on table driven code; and on early RANO approximations. He notes milestones in computer hardware, software, and applications, and describes the changing interaction between hardware and software development. Grace Hopper, Fletcher Jones, Owen Mock, Roy Nutt, and E.C. Yowell are mentioned several times.

**Citation:** Computer Oral History Collection, Archives Center, National Museum of American History.

**Computer Oral History Collection, 1969-1973, 1977**

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|---|---|
| **Interviewee:** | Byron Phelps |
| **Interviewer:** | Henry Tropp |
| **Date:** | September 20, 1973 |
| **Repository:** | Archives Center, National Museum of American History |
| **Description:** | Transcript, 46 pp. |

**Abstract:**

**Citation:** Computer Oral History Collection, Archives Center, National Museum of American History.



**Transcript:** http://invention.smithsonain.org/downloads/fa_cohc_tr_buch730720.pdf

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**Computer Oral History Collection, 1969-1973, 1977**

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|---|---|
| **Interviewee:** | Montgomery Phister |
| **Interviewer:** | Robina Mapstone |
| **Date:** | February 2, 1973 |
| **Repository:** | Archives Center, National Museum of American History |
| **Description:** | Transcript, 54 pp. |

**Abstract:** Phister, born in 1926, studied mathematics and engineering as an undergraduate at Stanford University. In 1950, he won a Fulbright fellowship to do graduate work under Maurice Wilkes at the Mathematics Laboratory of Cambridge University. He first worked on transistors and then wrote a Ph.D. thesis on error prevention and detection in automatic computers. Bill Renwick's engineering skills were essential to the success of the computer at the Mathematics Laboratory, the electronic Delay Storage Automatic Calculator (EDSAC). Phister helped maintain the machine and describes its operation, J.C.P. Miller, and Dave Wheeler's program to find prime numbers, Gill's learning program as displayed on a CRT screen, and tricks used to circumvent the EDSAC's limited memory. The EDSAC also was used to simulate microdiagnostics for the EDSAC II. When Phister completed his Ph.D. in 1953, he was hired by Hughes Aircraft Corporation to work on the Hughes commercial computer. He soon was also teaching computer logic design at the University of California at Los Angeles and eventually wrote a textbook on the subject. When Howard Hughes ended the business computer project, Phister wanted to work on computer control of chemical and petroleum processes. From 1955 to 1960, he worked on process control at Ramo-Wooldridge, planning possible systems for the Riverside Cement Company, Texaco, Standard Oil, Union Carbide, and Monsanto. An RW-30 actually was shipped to a Texaco plant for process control in 1958. The process control division of Ramo-Wooldridge became Thompson Ramo-Wooldridge Products Company, later TRW. TRW entered other areas as well, and its process control group became part of Bunker-Ramo and then General Electric. Well before this, Phister left to become chief engineer at Scantlin Electronics, a company that produced stockbroker quotation systems. He remained there six years. Stan Gill, Eldred Nelson, Bill Renwick, and Maurice Wilkes are mentioned several times in this interview.

**Citation:** Computer Oral History Collection, Archives Center, National Museum of American History.

**Computer Oral History Collection, 1969-1973, 1977**

**Computer Oral History Collection, 1969-1973, 1977**

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|---|---|
| **Interviewee:** | Dan Pickrell |
| **Interviewer:** | E.C. MacNamara |
| **Date:** | 1961-1966? |
| **Repository:** | Archives Center, National Museum of American History |
| **Description:** | Transcript, 84 pp. |

**Abstract:**

**Citation:** Computer Oral History Collection, Archives Center, National Museum of American History.

**Computer Oral History Collection, 1969-1973, 1977**

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|---|---|
| **Interviewee:** | Dan Pickrell |
| **Interviewer:** | Larry Saphire |
| **Date:** | October 13, 1970 |
| **Repository:** | Archives Center, National Museum of American History |
| **Description:** | Transcript, 69 pp. |

**Abstract:**

**Citation:** Computer Oral History Collection, Archives Center, National Museum of American History.

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**Computer Oral History Collection, 1969-1973, 1977**

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|---|---|
| **Interviewee:** | Harry Polachek |
| **Interviewer:** | Richard R. Mertz |
| **Date:** | March 24, 1970 |
| **Repository:** | Archives Center, National Museum of American History |
| **Description:** | Transcript, 44 pp. |

**Abstract:** Encouraged by his father and a high school teacher, Polachek studied mathematics as an undergraduate at Yeshiva University and while working on his master's degree at Columbia. He was teaching high school and working on his Ph.D. when called to the Aberdeen Proving Ground in 1941. After l 1/2 years using the electromechanical calculators and the Bush differential analyzer there, he continued to direct hand calculations of firing tables for a year in Philadelphia. Polachek then joined the Explosives Research Group at the Bureau of Ordnance. He worked with John von Neumann, using IBM accounting equipment to solve a cylindrical explosion problem. He also spent a week at Harvard solving on the Mark I, a problem relating to shock waves. After the war, Polachek completed his Ph.D. at Columbia and then went to the Naval Ordnance Laboratory (NOL) in 1947. He continued work on hydroballistics, using IBM machines to solve problems related to wind tunnels and shock waves. The Naval Ordnance Research Calculator/Computer (NORC) was built for NOL but went to the Navy Proving Ground at Dahlgren. In 1952, Polachek went to the David Taylor Model Basin, where his group put a Universal Automatic Computer (UNIVAC) to work solving actuarial problems, doing shelf inventories, and otherwise serving the Navy. John von Neumann and Norbert Wiener are mentioned several times in this oral history.

**Citation:** Computer Oral History Collection, Archives Center, National Museum of American History.



**Transcript:** http://invention.smithsonian.org/downloads/fa_cohc_tr_pola700324.pdf

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**Computer Oral History Collection, 1969-1973, 1977**

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|---|---|
| **Interviewee:** | Harry Polachek |
| **Interviewer:** | Richard R. Mertz |
| **Date:** | April 23, 1970 |
| **Repository:** | Archives Center, National Museum of American History |
| **Description:** | Transcript, 36 pp. |

**Abstract:** George Gamow and John von Neumann consulted at the Bureau of Ordnance frequently during World War II, with Gamow providing jokes and riddles as well as advice. The Card Programmed Calculator (CPC) was the most advanced computer at the Naval Ordnance Laboratory (NOL) in 1952 when Polachek left. During his years at the David Taylor Model Basin, the computers he was charged with were a Universal Automatic Computer (UNIVAC), an IBM 704, an IBM 709, an IBM 7090, and finally the Livermore Atomic Research Computer (LARK). In another section the Reeves Electronic Analog Computer (REAC) was used to simulate submarine action. The LARK was used in design of nuclear reactors for both submarines and power plants. Problems of storing explosives in World War II led to numerical solutions of heat conduction equations that revealed inadequacies in earlier mathematical techniques. In 1965, Polachek tired of administrative duties and joined the AEC. He mentions several staff of the David Taylor Model Basin and refers frequently to John von Neumann and George Gamow.

**Citation:** Computer Oral History Collection, Archives Center, National Museum of American History.

**Computer Oral History Collection, 1969-1973, 1977**

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|---|---|
| **Interviewee:** | Pollmeyer |
| **Interviewer:** | |
| **Date:** | August 1968 |
| **Repository:** | Archives Center, National Museum of American History |
| **Description:** | No transcript |
| **Abstract:** | See G. Neovius interview. |
| **Citation:** | Computer Oral History Collection, Archives Center, National Museum of American History. |
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**Computer Oral History Collection, 1969-1973, 1977**

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| **Interviewee:** | John A. Postley |
| **Interviewer:** | Robina Mapstone |
| **Date:** | March 12, 1973 |
| **Repository:** | Archives Center, National Museum of American History |
| **Description:** | Transcript, 48 pp. |

**Abstract:**

**Citation:** Computer Oral History Collection, Archives Center, National Museum of American History.

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**Computer Oral History Collection, 1969-1973, 1977**

**Interviewee:** Emmett Quady
**Interviewer:** Robina Mapstone
**Date:** May 15, 1973
**Repository:** Archives Center, National Museum of American History
**Description:** Transcript, 51 pp.

**Abstract:** Quady, born in 1920, graduated from the U.S. Naval Academy in 1942 and stayed in the Navy until 1946. The following year he went to work for Engineering Research Associates (ERA) on Navy communications projects (cryptography). Using a captured German magnetic drum as well as Minnesota Mining and Manufacturing products, ERA developed drum storage, especially techniques for reading off and writing on a drum simultaneously. ERA built both components and entire machines such as the DEMON I and DEMON II. Although some encouraged ERA information retrieval work for the Department of Agriculture and the Library of Congress, the company relied almost entirely on Navy contracts. Quady worked on a 64-position switch, magnetic drums and high speed relays. The ERA 1101 was to have an electrostatic Williams tube memory, but magnetic core was developed in time to serve as the main memory. ERA also built paper tape readers and designed a general purpose computer for IBM which some say became the IBM 650. The company had a general influence by training people and through Howard Engstrom's book *High-Speed Computing Devices*. In 1952, Quady moved to California for family reasons and went to work for Consolidated Engineering Corporation (later ElectroData). He worked on a copy of the California Digital Computer (CALDIC) sold to Corona and to the Jet Propulsion Laboratory in 1953 or 1954. Others at ElectroData were building a computer for Wright Field on an IBM subcontract and building magnetic drum units intended for, but not used in the Electronic recording and Machine Accounting (ERMA). Quady left ElectroData in 1954 to work for North American Autonetics. North American originally designed the North American Digital Analyzer (NATDAN), a transistorized digital differential analyzer, and the North American Programmed Automatic Computer (NATPAC), a transistorized general purpose computer with disc storage, both for the Navajo missile. When the Air Force canceled the Navajo in 1957 in favor of the Atlas intercontinental ballistic missile, North American built the Reliable COMputer (RECOMP), a disc memory, transistorized general purpose computer sold to the Air Force and others. The NATDAN

also gave rise to the Field Artillery Data Computer (FADAC) and to computers for the Polaris submarine and the Hound Dog and Minuteman missiles. IBM expressed interest in rights to the NATPAC. The CalComp plotter was designed at North American, but built outside the company. In 1960, Quady rejoined ERA, which by then was part of UNIVAC. John Aldrich, Arnold Cohen, and John Parker are mentioned several times in this interview.

**Citation:** Computer Oral History Collection, Archives Center, National Museum of American History.

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**Computer Oral History Collection, 1969-1973, 1977**

**Interviewee:** Jacob Rabinow
**Interviewer:** Richard R. Mertz
**Date:** November 23, 1970
**Repository:** Archives Center, National Museum of American History
**Description:** Transcript, 88 pp.

**Abstract:** Jacob Rabinow, born Jacob Rabinovich in the Soviet Ukraine in 1910, moved with his family to Siberia in 1914 where his father ran a shoe factory. In 1919, they moved to China, where his father died. With his mother and brother he then emigrated to the United States, where his mother established a corset shop in New York City. He did well as a student and also began to build and repair radios. As an undergraduate at the City College of New York, he changed his name to Rabinow and majored in electrical engineering, despite warnings that American firms did not hire Jewish engineers. After graduation in 1934, he worked at diverse jobs until he was hired by the National Bureau of Standards (NBS) in 1938. At NBS he first calibrated flowmeters and then, with the outbreak of World War II, designed proximity fuses for Army bombs and rockets. To calculate the velocity of the falling fuses, he devised an acceleration integrator. He also worked on bombing techniques. After the war, Rabinow came to know people at Aberdeen Proving Ground, and to work on input/output devices for computers. He invented the magnetic particle clutch used in tape and disk drives. Rabinow also became interested in a microfilm reader envisioned by Vannevar Bush called the Rapid Selector; this led to his more general interest in reading machines. Moreover, he assisted the Bureau of the Census in writing specifications for its UNIVAC computer. In about 1949 or 1950, Rabinow invented a magnetic disk file for computer memory and began to look at tape drives and wire recorders. He also worked on card sorters and card punches for the Bureau of the Census. He worked primarily on ordnance projects at the Bureau of Standards, and paid careful attention to the possible use of transistors in proximity fuses. In 1954, ordnance work at the Bureau of Standards was put under a military commander and Rabinow quit to form his own company, Rabinow Engineering. Projects included the development of automatic winding equipment and test equipment for Sprague Electric, design of a letter sorter later built by Burroughs, and of a digital computer, both for the U.S. Post Office, and construction of reading machines for RCA, UNIVAC, and others. When servicing machines began to require too much

staff and travel, Rabinow sold his company, remaining a consultant. The firm eventually became part of Control Data Corp. Rabinow describes at some length his magnetic disk file, the selective multiple punch he developed for the Bureau of the Census, and his instantaneous reversing motor. His most important contribution was work on reading machines and optical character recognition. He also mentions other computer developments at the Bureau of Standards, important inventors and patent lawyers in computer history, and the National Inventors Council of the Department of Commerce. People noted several times include Samuel Alexander, Allen V. Astin, J.V. Atanasoff, Vannevar Bush, Harry Diamond, Hugh L. Dryden, J.Presper Eckert, Joe Genovese, Sidney Greenwald, John W. Mauchly, Bill McClean, and David Rabinow.



**Transcript:** http://invention.smithsonian.org/downloads/fa_cohc_tr_rabi701123.pdf

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**Computer Oral History Collection, 1969-1973, 1977**

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|---|---|
| **Interviewee:** | Jan Rajchman |
| **Interviewer:** | Richard R. Mertz |
| **Date:** | October 26, 1970 |
| **Repository:** | Archives Center, National Museum of American History |
| **Description:** | Transcript, 33 pp. |

**Abstract:** Dr. Rajchman was born in London in 1911 of Polish parents and, after some early schooling in England and Poland, moved to Geneva at the age of ten because of his father's position with the League of Nations. He completed his education in Switzerland, receiving his Ph.D. in electrical engineering from the Swiss Federal Institute of Technology in 1938. He was associated with RCA in the United States eventually spent his career there. In 1939, he started working on computers for firing control of anti-aircraft weapons. He designed digital circuits for binary arithmetic, and in 1941, the year he became a U.S. citizen, he conceived the idea of the Computron tube for binary addition and multiplication. In 1943, as part of his work on radar, he started the design of the betatron tube for generating microwaves. In November 1945, he and John Von Neumann discussed RCA's role in memory design for the stored program computer at the Institute for Advanced Systems. This led to his development of the Selectron tube, the first magnetic memory tube, and then to the design of a core memory system. In 1946, Dr. Rajchman took part in the Moore School summer session at the University of Pennsylvania. In his interview he frequently mentions Vladimir Zworykin, John von Neumann, George Stiblitz, and Milton Rosenberg.

**Citation:** Computer Oral History Collection, Archives Center, National Museum of American History.



**Transcript:** http://invention.smithsonian.org/downloads/fa_cohc_tr_rajc701026.pdf

**Computer Oral History Collection, 1969-1973, 1977**

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|---|---|
| **Interviewee:** | Norman Ream |
| **Interviewer:** | Robina Mapstone |
| **Date:** | August 9, 1973 |
| **Repository:** | Archives Center, National Museum of American History |
| **Description:** | Transcript, 78 pp. |

**Abstract:**

**Citation:** Computer Oral History Collection, Archives Center, National Museum of American History.

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**Computer Oral History Collection, 1969-1973, 1977**

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|---|---|
| **Interviewee:** | Irving S. Reed |
| **Interviewer:** | Robina Mapstone |
| **Date:** | November 7, 1972 |
| **Repository:** | Archives Center, National Museum of American History |
| **Description:** | Transcript, 63 pp. |

**Abstract:** Born in 1923, Irving Reed graduated from the California Institute of Technology in 1944, spent two years as a radar specialist in the Navy, and then returned to Cal Tech to study for a Ph.D. in mathematics. From 1947 to 1949, he was a consultant to Northrop on the SNARK missile, working on the guidance system and on a mathematical analysis of how the DIDA computer integrated. In the spring of 1948, he learned of C.E. Shannon's papers from his professor, E.T. Bell, and told Floyd Steele about them. When Reed received his Ph.D. in 1949, he went to work at Northrop, first on the star tracker for guidance of the SNARK and then on the Magnetic Drum Digital Differential Analyzer (MADDIDA). He learned to use the Binery Automatic Computer (BINAC) on a one-week visit to Eckert-Mauchly Corporation in 1949, but doubts that it would have worked in flight. He also describes the demonstration of the MADDIDA to John von Neumann in Princeton, at a Rutgers University meeting of the Association for Computing Machinery (ACM) and at Wright Field. Eric Ackerlind, Donald Eckdahl, Grace M. Hopper, J.W. Mauchly, Dick Sprague, John von Neumann, and especially Floyd Steele are mentioned in several places.

**Citation:** Computer Oral History Collection, Archives Center, National Museum of American History.

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**Computer Oral History Collection, 1969-1973, 1977**

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|---|---|
| **Interviewee:** | Irving S. Reed |
| **Interviewer:** | Robina Mapstone |
| **Date:** | December 19, 1972 |
| **Repository:** | Archives Center, National Museum of American History |
| **Description:** | Transcript, 52 pp. |

**Abstract:** Setting up the electric cannon problem for the Wright Field demonstration of the Magnetic Drum Digital Differential Analyzer (MADDIDA) took all night. After H. Sarkissian, F. Steele, D. Eckdahl and R. Sprague left Northrop, Reed joined them at Computer Research Corporation (CRC) as director for theoretical research. The company's first computer, the CRC 101, went to North American for use with the Navajo missile, while the Cambridge Digital Automatic Computer (CADAC) was built for the Air Force for use in air traffic control. Disruption at CRC led Reed to leave for Lincoln Laboratories. There he worked on the CADAC when it was delivered and spent a few months on temporary assignment to the Digital Computer Laboratory, working on logic design for what became the Semi-Automatic Ground Environment (SAGE). Back at Lincoln Laboratories, he worked on a radar data processor that was later developed by Burroughs as the FST-2. Designers of the FST-2 were much more open to the use of Boolean algebra than others Reed encountered on the east coast. The machine contained early circuit boards. Reed spent a few months in 1955 designing airborne bombing computers at Librascope, but soon returned to Lincoln Laboratories to plan transistorized computers for use at sites of the SAGE system. The general purpose machine developed, the CG-24, even had a transistorized core. It went into operation in early 1957 and actually was used to run orbit calculations on the Sputnik. D. Eckdahl, Jay Forrester, J.B. Harrington, Dick Jeffrey, Ronald Mayer, H. Sarkissian, R. Sprague, F. Steele, and G. Valley are mentioned several times in this interview.

**Citation:** Computer Oral History Collection, Archives Center, National Museum of American History.

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**Computer Oral History Collection, 1969-1973, 1977**

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|---|---|
| **Interviewee:** | Mina Rees |
| **Interviewer:** | Uta C. Merzbach |
| **Date:** | March 19, 1969 |
| **Repository:** | Archives Center, National Museum of American History |
| **Description:** | Transcript, 11 pp. |

**Abstract:** Rees, born in 1902, attended Hunter High School, majored in mathematics at Hunter College, and obtained her master's in math from Columbia University in 1925. She completed her Ph.D. at the University of Chicago in 1931, with a dissertation on abstract algebra. Rees returned to teach at Hunter College until the Applied Mathematics Panel of the Office of Scientific Research and Development was established in 1943. Upon the recommendation of Richard Courant, she came to serve under Warren Weaver as the Panel's secretary and technical aide. Projects sponsored involved operations research, statistics, gunnery, and computers. After World War II, Rees headed up the mathematics section of the Office of Naval Research (ONR). ONR had sponsored projects on analog computing and in conformable mapping before she arrived. Afterward, emphasis shifted to digital computers, and applied mathematics was defined more generally. Saunders MacLane and Warren Weaver are mentioned several times in this interview.

**Citation:** Computer Oral History Collection, Archives Center, National Museum of American History.



**Transcript:** http://invention.smithsonian.org/downloads/fa_cohc_tr_rees690319.pdf

**Computer Oral History Collection, 1969-1973, 1977**

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|---|---|
| **Interviewee:** | Mina Rees |
| **Interviewer:** | Henry Tropp |
| **Date:** | September 14, 1972 |
| **Repository:** | Archives Center, National Museum of American History |
| **Description:** | Transcript, 17 pp. |

**Abstract:** John Curtiss and Rees agreed that mathematicians needed a place to become familiar with computers and they pushed for the formation of the Institute for Numerical Analysis at the University of California at Los Angeles. Rees developed an appreciation for the broad uses of science during World War II. She describes the founding and funding of the Courant Institute at New York University and of the Institute for Numerical Analysis (INA). Projects funded by the Office of Naval Research included the INA, the expensive Whirlwind Project, which led to the introduction of magnetic core memory, and the SEAC. Discoveries made on ONR grants were passed on to Navy officers. John Curtiss is mentioned frequently.

**Citation:** Computer Oral History Collection, Archives Center, National Museum of American History.



**Transcript:** http://invention.smithsonian.org/downloads/fa_cohc_tr_rees720914.pdf

**Computer Oral History Collection, 1969-1973, 1977**

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|---|---|
| **Interviewee:** | Mina Rees |
| **Interviewer:** | Henry Tropp |
| **Date:** | October 20, 1972 |
| **Repository:** | Archives Center, National Museum of American History |
| **Description:** | Transcript, 49 pp. |

**Abstract:** John von Neumann provided useful explanations for Rees and was enthusiastic about ENIAC. The Office of Naval Research (ONR) supported diverse projects, including an analog computer used by Ray Pepinsky for crystallography at Pennsylvania State University, astronomical research on trajectories, and research on numerical analysis by C.B. Tompkins, Abe Taub, the Lehmers and Alston Householder. By telling Navy officers about George Dantzig's work for the Air Force on linear programming, ONR aided formation of the Logistics Research Project. Rees describes her hiring by ONR in 1946, the development of aid for analysis and statistics into support for other areas of mathematics, early work on simulation, and people she visited in the United States and abroad. Richard Courant, John Curtiss, George Dantzig, Alston Householder, Mr. and Mrs. D.H. Lehmer, B. Rosser, Abe Taub, C.B. Tompkins, O. Veblen, and John von Neumann are mentioned several times.

**Citation:** Computer Oral History Collection, Archives Center, National Museum of American History.



**Transcript:** http://invention.smithsonian.org/downloads/fa_cohc_tr_ rees721020.pdf

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**Computer Oral History Collection, 1969-1973, 1977**

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| **Interviewee:** | Ida Rhodes |
| **Interviewer:** | Henry Tropp |
| **Date:** | March 21, 1973 |
| **Repository:** | Archives Center, National Museum of American History |
| **Description:** | Transcript, 41 pp. |

**Abstract:** Rhodes, born in Russia, earned her BA and MA in mathematics from Cornell University in 1923. She learned of the Works Progress Administration's Mathematical Tables Project (MTP) through a fellow employee of the New York State Unemployment Insurance Agency and began working at the MTP in 1940. After a day of supervising calculations, Rhodes and Gertrude Blanch spent their evenings checking work and making out worksheets. Key values of functions were calculated using hand-cranked desk calculators. Otherwise, computations were done by hand. In addition to preparing tables the MTP performed calculations at the request of various mathematicians. The project was transferred to the National Defense Research Council during World War II, and work proceeded with reduced staff but greatly improved calculating machines. The Bell relay calculator would have speeded computations even more, but it could not operate in the MTP building and was sent to the National Research Laboratory. After the war, the project was transferred to the National Bureau of Standards. Rhodes went to Washington, D.C., to help supervise construction of the UNIVAC and the Hurricane, and also worked on coding for the SEAC. She later took an interest in assisting communication for the handicapped. Milton Abramowitz, Sam Alexander, Gertrude Blanch, Edward W. Cannon, Leslie J. Comrie, E.U. Condon, John H. Curtiss, Jack Laderman, and Arnold Lowan are mentioned frequently in this interview.

**Citation:** Computer Oral History Collection, Archives Center, National Museum of American History.



**Transcript:** http://invention.smithsonian.org/downloads/fa_cohc_tr_rhod730321.pdf

**Computer Oral History Collection, 1969-1973, 1977**

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| **Interviewee:** | Rex Rice |
| **Interviewer:** | Robina Mapstone and Henry Tropp |
| **Date:** | October 10, 1972 |
| **Repository:** | Archives Center, National Museum of American History |
| **Description:** | Transcript, 70 pp. |

**Abstract:**

**Citation:** Computer Oral History Collection, Archives Center, National Museum of American History.



**Transcript:** http://invention.smithsonian.org/downloads/fa_cohc_tr_rice721010.pdf

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**Computer Oral History Collection, 1969-1973, 1977**

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| **Interviewee:** | Nathaniel Rochester |
| **Interviewer:** | Henry Tropp |
| **Date:** | July 24, 1973 |
| **Repository:** | Archives Center, National Museum of American History |
| **Description:** | Transcript, 53 pp. |

**Abstract:** Rochester studied electrical engineering at the Massachusetts Institute of Technology (MIT) and was working in acoustics at the outset of World War II. During the war, he worked on radar at the MIT Radiation Laboratory and at Sylvania, building equipment for the Radiation Laboratory. After the war, he worked on the arithmetic unit for Whirlwind and on cryptanalysis equipment for the national Security Agency (NSA). In 1948, feeling that computers would be a "major thing," he went to IBM where he urged their development. His work on a study of the significance of magnetic tape lead to the IBM 700 series. He discusses assembly programming, the switches from card to tape and from decimal to binary systems, the seesawing of the relative reliability of software and hardware, and the advantages and disadvantages of system compatibility. Special mention is made of: the 1946 summer school program at the University of Pennsylvania; the 1947 Aberdeen meeting; and the meeting called by Tom Watson, Jr., at which the decision was made to go ahead with the 700 series, thus making a commitment to computers. Jean Sammett sat in on the interview. Among those often mentioned are John von Neumann, Ralph Palmer, Werner Buchholz, Cuthbert Hurd, and Steve Dunwell.

**Citation:** Computer Oral History Collection, Archives Center, National Museum of American History.



**Transcript:** http://invention.smithsonian.org/downloads/fa_cohc_tr_roch730724.pdf

**Computer Oral History Collection, 1969-1973, 1977**

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| **Interviewee:** | Jim Rogers |
| **Interviewer:** | Robina Mapstone |
| **Date:** | November 11, 1973 |
| **Repository:** | Archives Center, National Museum of American History |
| **Description:** | Transcript, 17 pp. |

**Abstract:** Discusses the Burroughs Adding Machine Company and its Computer Laboratory. Rogers was an applications engineer and the first project he was involved with was the E101, a bookkeeping machine. Rogers comments in detail on the E101 and its features.

**Citation:** Computer Oral History Collection, Archives Center, National Museum of American History.

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**Computer Oral History Collection, 1969-1973, 1977**

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| **Interviewee:** | Stanley Rogers |
| **Interviewer:** | Robina Mapstone |
| **Date:** | August 9, 1973 |
| **Repository:** | Archives Center, National Museum of American History |
| **Description:** | Transcript, 65 pp. |

**Abstract:** Rogers graduated from Occidental College in 1932 with a physics major and minors in mathematics and modern languages. He did graduate work in sociology at the University of Southern California, taking a minor in economics. Rogers then became a development engineer at General Communications Products, taught mathematics and radio-television theory at American Television Laboratories, and assisted Lee De Forest in the design of a radar altimeter. Next he went to work at Convair, spending his first few months studying electrical engineering at the Massachusetts Institute of Technology (MIT). Rogers then started using IBM machines from Convair's accounting department to calculate electrical overloads on bombers. In 1948, the Navy offered Convair a Reeves Instrument Company analog computer that had been used to simulate the flight of the Livermore Atomic Research Computer (LARK) missile. Convair soon decided to build its own analog computer for installations in San Diego and Pomona. It featured improved patch boards, a semiautomatic test system, and checks on the electrical systems. In the mid-l950s, Rogers led a group at Convair that designed a digital computer to process radar information. When this project fell through in 1962, he spent some time in administration and then became involved in spaceflight simulation. During his final years at Convair he worked on wide-band communications switching. Rogers comments on the effectiveness of IBM salesmen, on Project Cyclone and Project Hurricane, and on the origins of Simulations Councils, Inc., and the monthly journal *Simulation*.

**Citation:** Computer Oral History Collection, Archives Center, National Museum of American History.

**Computer Oral History Collection, 1969-1973, 1977**

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| **Interviewee:** | Milton Rosenberg |
| **Interviewer:** | Robina Mapstone |
| **Date:** | February 19, 1973 |
| **Repository:** | Archives Center, National Museum of American History |
| **Description:** | Transcript, 26 pp. |

**Abstract:**

**Citation:** Computer Oral History Collection, Archives Center, National Museum of American History.



**Transcript:** http://invention.smithsonian.org/downloads/fa_cohc_tr_rose730219.pdf

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**Computer Oral History Collection, 1969-1973, 1977**

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| **Interviewee:** | Paul Rosenthal |
| **Interviewer:** | Henry Tropp |
| **Date:** | May 16, 1973 |
| **Repository:** | Archives Center, National Museum of American History |
| **Description:** | Transcript, 18 pp. |

**Abstract:** Paul Rosenthal was born in 1928 and received his BA, MA, and MSA from Temple University. Rosenthal became interested in computing at Temple University from some fellow classmates who were engineers. In 1951, Rosenthal was working for the Philadelphia School System substitute teaching when he obtained an interview with Computer Corporation—the Eckert/Mauchly Group—which started him in the computer field. After training, Rosenthal was assigned a programming task. He was also involved with the systems test routine for the Universal Automatic Computer (UNIVAC) and other problems run in the UNIVAC. Rosenthal discusses individuals who made significant contributions to the field of computing. He mentions Steve Wright, a programmer that Rosenthal considered the father of systems programming. Wright did the first thinking on assemblers and compilers. Herb Mitchell's name is also mentioned as contributing to the field, particularly with regard to hiring individuals and finding talent. Rosenthal comments on the differences between the West and East Coast philosophies in 1955. Rosenthal felt that the real ideas came from the east coast. Frequently mentioned colleagues include Grace Murray Hopper, Erwin Tomash, Courant, and Teller, and Betty Holberton.

**Citation:** Computer Oral History Collection, Archives Center, National Museum of American History.



**Transcript:** http://invention.smithsonian.org/downloads/fa_cohc_tr_rose730516.pdf

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**Computer Oral History Collection, 1969-1973, 1977**

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| **Interviewee:** | Morris Rubinoff |
| **Interviewer:** | Richard R. Mertz |
| **Date:** | May 17, 1971 |
| **Repository:** | Archives Center, National Museum of American History |
| **Description:** | Transcript, 38 pp |

**Abstract:** Morris Rubinoff was born in 1917 and received his B.A. in 1941, M.A. in 1942, and Ph.D. in 1946, from the University of Toronto. Rubinoff's early training was in mathematics and physics as an undergraduate and in physics as a graduate. The interest in computing began at the University of Toronto where a post World War II project supported by the Canadian Army was underway. Rubinoff did calculations of trajectories using a method known as the Richardson method on a desk calculator. Rubinoff's Ph.D. work involved the measurement of spinning projectiles in space. After completing the Ph.D., Rubinoff succeeded in obtaining a half-time position in the physics department and a half-time position in the computation laboratory at Harvard University. Rubinoff assisted Aiken in building MARK III, a vacuum tube computer. From 1946 to 1948, Rubinoff participated actively in the design of many of the MARK machines attributes. These included amplifiers, and algorithms to implement logic. Comments on the individuals associated with the Computing Lab at Harvard and the various projects they worked on. In 1948, Rubinoff joined the Institute for Advanced Study (IAS) at Princeton University under the direction of Julian Bigelow. At Princeton, Rubinoff was a design engineer involving hardware issues and later an output printer. This printer was a wet process in which electrolytic paper generated color by passing an electric current through the dampness. He discusses colleagues working at IAS and their contributions to the machine. In 1950, Rubinoff went to the Moore School at the University of Pennsylvania where he reconstructed and reconfigured the computer activities. At the same time, Ruibinoff became a consultant with Philco Corporation in 1957 and ultimately took a two year leave of absence from the Moore School. In 1959, Rubinoff returned to the Moore School as a Professor of Electrical Engineering. Some colleagues mentioned include Chaim L. Pekeris, Howard Aiken, Benjamin Moore, Way Dang Woo, Grace Murray Hopper, Richard Bloch, Robert Campbell, Harry Fuller, Julian Bigelow, John von Neumann, Ralph Slutz, Willis Ware, and Issac Auerbach.

**Computer Oral History Collection, 1969-1973, 1977**

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