Computer Oral History Collection, 1969-1973, 1977

Interviewee: Forman Acton
Interviewer: Richard R. Mertz
Date: January 21, 1971
Repository: Archives Center, National Museum of American History
Description: Transcript, 48 pp.

Abstract: Forman Acton, born in 1920, completed a degree in chemical engineering at Princeton in 1944, spent the rest of World War II in the U.S. Army's engineering detachment at Oak Ridge, and then earned a doctorate in applied mathematics at the Carnegie Institute of Technology, working especially with J.L. Synge and Albert Heins. He took an early interest in communicating engineering problems to digital computers. After graduation, Acton spent three years at the U.S. National Bureau of Standard's Institute for Numerical Analysis at the University of California at Los Angeles. There he taught numerical analysis and developed programming for the SWAC, then under construction. In 1952 Acton returned to Princeton to direct the weapons systems analysis group and teach courses in the Mathematics Department. Four years later he joined the faculty of the Princeton Electrical Engineering Department, where he remained for the rest of his career. In Los Angeles Acton made extensive use of the first Card Programmed Calculator; back at Princeton he used Model II of the CPC. He also comments on the LAS computer, both as it was developed by von Neumann and as it was later used in the electrical engineering department. Another machine discussed at some length is the IBM 650, the first commercial computer purchased by Princeton. Acton refers to numerous contemporaries, especially J. Curtiss, J.B. Rosser, A. Tucker, J. Tukey, and John Mauchly.

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

Smithsonian
National Museum of American History
Lemelson Center for the Study of Invention and Innovation

Computer Oral History Collection, 1969-1973, 1977

Interviewee: Charles Adams
Interviewer: Richard R. Mertz
Date: December 3, 1969
Repository: Archives Center, National Museum of American History
Description: Transcript, 28 pp.

Abstract: Charles Adams was born in Indiana in 1925 and raised in Pittsburgh. He entered the Massachusetts Institute of Technology (MIT) in 1942 and completed an undergraduate degree in physics in 1948. This time included two years spent as an electronics expert in the U.S. Navy. After the war, he worked part-time in MIT's Servomechanisms Laboratory, writing a memo on programming. After graduation, he continued at MIT, preparing a 1949 M.A. thesis on routines and subroutines. He then joined the staff of the MIT Division of Industrial Cooperation. Adams was particularly concerned with preparing routines for the Whirlwind computer, including the assembly language program, the design of floating-point arithmetic, and utility routines for debugging. As the head of the Scientific Engineering Applications group, he aided users in solving unclassified problems in physics, engineering, and other disciplines. He also taught programming in the electrical engineering department and in summer courses, using the book on programming the EDSAC by Maurice Wilkes, D.J. Wheeler, and Stanley Gill. In 1955, Adams and his family moved to Venezuela, where he worked with Creole Petroleum Company; he has since worked with private companies in the United States. Colleagues mentioned several times in the interview include R. Everett, Jay Forrester, P. Franklin, J.T. Gilmore, and Maurice Wilkes.

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

Computer Oral History Collection, 1969-1973, 1977

Interviewee:	Howard Aiken
Interviewer:	Henry Tropp and I. Bernard Cohen
Date:	February 26-27, 1973
Repository:	Archives Center, National Museum of American History
Description:	Transcript, 182 pp.

Abstract: Howard Hathaway Aiken was born in 1900. He earned an undergraduate degree in electrical engineering from the University of Wisconsin in 1923, a Masters in Physics from Harvard in 1937, and his Ph.d in Physics from Harvard in 1939. He was the designer and developer of the first large-scale operating relay calculator in the United States. Aiken begins with a discussion of problems associated with mechanical computation while writing his thesis. He comments on Leslie John Comrie and his contributions to computational techniques and discusses his proposal for the MARK I and IBM's agreement and involvement in 1939, to build the machine. Aiken comments on his choice to design MARK I as an electronic device. He was motivated by money because digital counters made with vacuum tubes would have involved thousands of parts which would have been expensive. Aiken comments on early discussions with IBM about what kind of machine would eventually be built and their funding of the machine. He recalls learning that IBM could not divide and how he invented the technique of dividing by computing by reciprocals in response to this problem. Because of what Aiken introduced, the divider became a standard technique in IBM's technical machine design thereafter. The MARK I machine never did any computations for IBM, but rather split its computing time between a project for the Navy and for Harvard. Ultimately, Aiken's MARK machines were used by several other government agencies. He comments on his tenure on the National Academy of Sciences Commission and he discusses the other individuals on the committee—John von Neumann, George Stibitz, and John Curtiss—to name a few. Curtiss promoted the idea of starting an association for people interested in computing machines, which Aiken was opposed to. Curtiss ultimately founded the Association for Computing Machinery which Aiken never joined. The conferences Aiken held at Harvard University beginning in 1946 were solely his doing. He selected the participants and topics to be discussed. These conferences/lectures were, according to Aiken, essential to getting the field of computing ahead at that time. He comments at length on his work outside of the United States, specifically in Europe,

and the individuals with whom he worked. Because of Aiken's work at Harvard with MARK, he had a steady stream of foreign researchers who came to work with his machine. He discusses at length the chronology of his four large scale calculators: MARK I, II, III and IV. MARK II was built for the Naval Proving Ground at Dahlgren and implemented in 1950. Aiken would then proceed to design MARK III almost at the same time, 1948 to 1950, and later MARK IV from 1950 to 1952. There was an overlap in the construction and conceptual periods for all the MARK machines. After all of Aiken's MARK machines were built, he felt his effort with computers was completed too and that competing with the industry would not be wise.

The second portion of this interview was conducted on February 27, 1973, and begins with a discussion of Aiken's method of division using the Newton-Raffson rule. Comments include subsequent machines, problems and users, historical digressions, elaboration on specific computing techniques, documentation regarding miscellaneous people and events, and some biographical background information. Those mentioned frequently include: Leon Chaffee, Leslie John Comrie, Donald Menzel, Ted Brown, Harlow Shapley, J.G. Phillips, E.B. Huntington, Ted Kimball, George Stibitz, Dick Bloch, Norbert Wiener, and Grace Murray Hopper.

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

Transcript: http://invention.smithsonian.org/downloads/fa_cohc_tr_aike73027.pdf

Computer Oral History Collection, 1969-1973, 1977

Interviewee:	Gerard Allard
Interviewer:	Robina Mapstone
Date:	April 9, 1973
Repository:	Archives Center, National Museum of American History
Description:	Transcript, 74 pp.

Abstract: Allard, born in 1920, received his B.S. in physics at Laval University in Quebec in 1946. He immediately went to work for General Electric (GE) at the Knoll Atomic Power Laboratory in Schenectady, N.Y. Another group working at the laboratory had a Card Programmed Calculator (CPC) which intrigued Allard. He decided to leave GE and work with computers. From 1952 until 1954, he worked at the Chicago Midway Laboratories, learning about computer design in the style of the EDVAC. When the project was terminated, he returned to a GE laboratory in Syracuse, working on transistor development and studying books like R.K. Richard's *Arithmetic Operations in Digital Computers*. The Bank of America had been interested for some time in purchasing a computer that would process checks automatically. They had originally worked with the Stanford Research Institute, but in 1955, awarded a contract to GE to build the ERMA (Electronic Recording (and) Machine Accounting). Allard moved to Palo Alto, California to be part of the group working on the ERMA, with special responsibilities for logic design. He went on to spend much of 1958 in Phoenix, handling problems of process control. Further projects included designing the core of the GE 225, work on improving the Ampex magnetic tape transport, and design for the GE 235. In addition to these projects Allard discusses the significance of word length in computer design, problems of precision, and GE's hesitancy to commit for resources to computer development. Names mentioned often include R. Johnson, J. Paivenen, and Henry Herold.

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

Smithsonian
National Museum of American History
Lemelson Center for the Study of Invention and Innovation

Computer Oral History Collection, 1969-1973, 1977

Interviewee:	John Alrich
Interviewer:	Robina Mapstone
Date:	February 9, 1973
Repository:	Archives Center, National Museum of American History
Description:	Transcript, 57 pp.

Abstract: Alrich, born in 1923, graduated from the University of California at Berkeley in communications electrical engineering in 1948. He first went to work at Bendix Aviation Corporation preparing vacuum tube receivers for the Aerobee rocket, but soon moved on to Fairchild Camera and Instrument Corporation, where he designed film potentiometers. In 1951, Alrich moved to Consolidated Electrodynamics Corporation (CEC), a manufacturer of scientific equipment that built digital computers to analyze data from its mass spectrometers. Within a few years, CEC sold its computer division, ElectroData, to Burroughs. Alrich continued to work on the logic design for the ElectroData 201's arithmetic section. He then designed a floating point control unit that became part of the ElectroData 205. Alrich worked under John Lenz on a prototype IBM 610 Autopoint, a device built by Burroughs under subcontract to IBM. His final post with Burroughs was as project manager for the Burroughs 220, one of the last commercial computers to use vacuum tubes. Alrich refers several times to the Burroughs 5000, although he did not work on this machine. He left Burroughs in 1959 and has subsequently worked on problems of process control, logic design, and management at several California companies. The interview contains numerous scattered comments about the personalities and work of computer scientists, especially those on the west coast. Those mentioned several times are Cliff Berry, Ernst Selmer, John von Neumann, Harry Huskey, J. Bradburn, L.P. Robinson, Allan Beek, P. Brock, Ed McCollister, and John Lenz.

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

Computer Oral History Collection, 1969-1973, 1977

Interviewee: Franz Alt
Interviewer: Uta C. Merzbach
Date: February 24, 1969
Repository: Archives Center, National Museum of American History
Description: Transcript, 11 pp.

Abstract: Franz Alt was born in Vienna in 1910, went to school there, and then came to the U.S. He was diverted from the study of statistical methods of business forecasting by World War II. Drafted into the U.S. Army, he was sent to Aberdeen Proving Grounds in the spring of 1945, where he served with Derrick Lehmer, Haskell Curry, and Leland Cunningham on the Computations Committee. He took a particular interest in the IBM relay calculator and, after the war, in the relay calculators built for Aberdeen by Bell Laboratories. Although not directly involved with the ENIAC, he was aware of how it was programmed and used.

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

Transcript: http://invention.smithsonian.org/downloads/fa_cohc_tr_alt690224.pdf

Computer Oral History Collection, 1969-1973, 1977

Interviewee:	Franz Alt
Interviewer:	Uta C. Merzbach
Date:	March 13, 1969
Repository:	Archives Center, National Museum of American History
Description:	Transcript, 31 pp.

Abstract: Alt found the theoretical mathematics he studied in Vienna particularly useful to his later work in computing. He also experienced organizing manual computing, but never took any special interest in mechanical objects. During his first years in the U.S. Army, Alt served in the ski troops and trained as an officer in the Chemical Warfare Service. Once assigned to Aberdeen, he worked directly under L.S. Dederick and under the more general supervision of Colonel Leslie Simon. During World War II, civilians and military personnel at Aberdeen assumed that they were there temporarily. Afterward, the community was smaller and more permanent. Within the organization of the Coating Laboratory, Alt was most actively interested in logic design, particularly for the Bell Laboratories relay computer. He comments on the use of a floating decimal point in this machine and on the introduction of the tera routine at Bell Laboratories. Those mentioned several times in this interview are Derrick Lehmer and John von Neumann.

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

Transcript: ttp://invention.smithsonian.org/downloads/fa_cohc_tr_alt690313.pdf

Smithsonian
National Museum of American History
Lemelson Center for the Study of Invention and Innovation

Computer Oral History Collection, 1969-1973, 1977

Interviewee:	Franz Alt
Interviewer:	Henry Tropp
Date:	September 12, 1972
Repository:	Archives Center, National Museum of American History
Description:	Transcript, 98 pp.

Abstract: Early programs on the ENIAC included one for calculating firing tables, one for finding sines and cosines, and a third by Nicholas Metropolis that calculated the consequences of a fluid dynamic model of the atomic nucleus. A test program by Derrick H. Lehmer found large prime numbers. Following the pattern of the differential analyzer, designers of the ENIAC and the Bell Laboratories relay computer assumed that one adder was required for each storage unit. Although some function tables were built into the ENIAC, it was only with von Neumann's work that stored programs made it possible to have one adder serve several storage units. There were three early milestones in the history of computers: the introduction of electronic machines like the ENIAC; the concept of stored programs with both operating instructions and branch points; and the use of core memories, which made large storage capacities possible. Relay computers were not such a milestone, although the use of automatic controls to check each step of a computation was extremely clever. Alt left Aberdeen in 1948 to work at the National Bureau of Standards on the Standards Eastern Automatic Computer (SEAC), a machine designed to solve problems of physics and chemistry and to address the needs of the Bureau of the Census and the U.S. Air Force. Alt had varying supervisory duties with respect to the development of the Standards Western Automatic Computer (SWAC). The Institute for Numerical Analysis found that the computer had an important influence on the development of numerical analysis. Alt comments on a wide range of topics relating to the history of computing, including work with calculating machines by the Mathematical Tables Project in New York and by L.J. Comrie in Britain, the use of the word "computer" to apply to a machine and not a person, the existence of the Binar Automatisk Rela Kalkylator (BARK), Electronic Delay Storage Automatic Calculato (EDSAC), Binary Automatic Computer (BINAC) and Universal Automatic Computer (UNIVAC), and the lifetime of a common computer program. People mentioned frequently in this interview include Howard Aiken, J. Curtiss, G. Forsythe, D.H. Lehmer, John W. Mauchly,

Smithsonian
National Museum of American History
Lemelson Center for the Study of Invention and Innovation

Mina Rees, C.B. Tompkins, 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_alt720912.pdf

Computer Oral History Collection, 1969-1973, 1977

Interviewee:	Argonne National Laboratories
Interviewer:	Henry Tropp
Date:	June 21, 1972
Repository:	Archives Center, National Museum of American History
Description:	Transcript, 83 pp.

Abstract: This interview has ten participants: Margaret Butler, Jim Butler, Dave Jacobsohn, Charles Harrison, Claire Kilty, Burt Garbow, Stan Zawadzki, Bob Kroupa, Franz Morehouse, and Wallace Givens. Participants discuss the design and building of a computing machine in 1949 at the Argonne National Laboratories in Illinois.

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

Computer Oral History Collection, 1969-1973, 1977

Interviewee:	Paul Armer
Interviewer:	Robina Mapstone
Date:	April 17, 1973
Repository:	Archives Center, National Museum of American History
Description:	Transcript, 72 pp.

Abstract: Paul Armer, born in 1924, studied chemistry at Loyola University in Los Angeles. His college career was interrupted by the armed services, where he worked in meteorology. After completing his A.B., he first worked as a dispatcher for United Airlines and then, in 1947, went to RAND. He first worked with a desk calculator and then joined Cecil Hastings in programming IBM accounting machines for scientific computing. By 1952, Armer was in charge of the numerical analysis department at RAND; he remained there until 1968. He then headed the Stanford Computer Center, and went on to be an associate in the Harvard Program on Technology and Society. In his early years at RAND, Armer and his colleagues used modified IBM machines and the Card Programmed Calculator (CPC) to study such problems as the optimal design of airplanes and the incidence of mental illness in the U.S. He discusses the goals of RAND's John von Neumann's Integrator and Automatic Computer (JOHNNIAC), which was modeled on the Institute for Advanced Study (IAS) computer, but used punched cards for both input and output. The JOHNNIAC was specially designed to be reliable, with an RCA Selectron memory, and to have improved "human engineering," with a console for entering data rather than a paper tape. It was used especially for air defense training, simulating radar scopes. To implement the air defense system developed with JOHNNIAC, RAND established a Systems Development Division, which later programmed the Semi-Automatic Ground Environment (SAGE) and broke off into the Systems Development Corporation. Armer encouraged the development of RAND's programming language, the Johnniac Open System (JOSS), and participated in several groups of computer users, including: the Digital Computers Association, PACT (Project for the Advancement of Coding Techniques) for users of the IBM 701, SHARE for users of the IBM 704, and GUIDE for users of the IBM 702 and IBM 705. He taught programming one term at the University of Southern California. He comments on Fred Gruenberger's attempts to educate school teachers, on the use of mental tests to select programmers, on early lack of perception concerning the wide

	potential use of computers, and on the problems of protecting privacy in a computerized society. He highlights the idea of the stored program, the transistor, assembly programs, and compilers as key developments in the early history of computers. People mentioned frequently in the interview include G.W. Brown, W. Gunning, C. Hurd, D. Hadden, A. Newell, S. Shaw, J. Strong, and J. Williams.
Citation:	Computer Oral History Collection, Archives Center, National Museum of American History.
Copyright:	
Transcript:	http://invention.smithsonian.org/downloads/ fa_cohc_tr_armer730417.pdf

Smithsonian
National Museum of American History
Lemelson Center for the Study of Invention and Innovation

Computer Oral History Collection, 1969-1973, 1977

Interviewee:	Association for Computing Machinery National Conference
Interviewer:	Panel Discussion
Date:	August 30, 1967
Repository:	Archives Center, National Museum of American History
Description:	Transcript, 90 pp.

Abstract: This was a panel discussion given at the annual meeting of the Association for Computing Machinery entitled "In the Beginning, Reminiscences of the Creators." Several individuals participated in this discussion: Issac Auerbach, Bruce Gilchrist, Sam Alexander, Bruce Schoonover, George Stibitz, Richard Bloch, John Mauchly, Herman Goldstine, Edward Cannon, Maurice Wilkes, Grace Hopper, Jay Forrester, Arnold A. Cohen, E.G. Andrews, Ed Berkley, Leslie Simon, Donald Eckdhal, Herb Grosch, Henry Polachek, Richard Turner, Jan Rajchman, Jerry Haddard, Betty Holberton, and Arthur Burks. Gilchrist opens the discussion with the presentation of the 1967 Harry Good Memorial Award to Sam Alexander. Auerbach sets the ground rules for the panel discussion and provides background as to why they are doing it. Each panel member comments about the era with which he or she is most familiar and provide some personal comments.

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

Transcript: http://invention.smithsonian.org/downloads/fa_cohc_tr_acm670830.pdf

Smithsonian
National Museum of American History
Lemelson Center for the Study of Invention and Innovation

Computer Oral History Collection, 1969-1973, 1977

Interviewee:	Association for Computing Machinery Meeting “Quarter Century View, the Look Back”
Interviewer:	Henry Tropp
Participants:	William J. Osterman, Harvey L. Poppel, Mortimer Rogoff, Frederic Withington, Harvey Golub, and Anthony C. Octtinger
Date:	August 3, 1971
Repository:	National Museum of American History
Description:	Transcript, 21 pp.

Abstract: Transcriber transcribed Tape 1. The majority of the audio was poor with some participants completely inaudible. Tape 2 quality is poor and transcription was discontinued.

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

Transcript: http://invention.smithsonian.org/downloads/fa_cohc_tr_acm710803.pdf

Smithsonian
National Museum of American History
Lemelson Center for the Study of Invention and Innovation

Computer Oral History Collection, 1969-1973, 1977

Interviewee:	Association for Computing Machinery, General Meeting
Participants:	Walter Carlson, Henry Tropp, Ed Berkeley, Harry Hazen, Dick Clippinger, Betty Holberton, John Mauchly, Ross ?, Chuan Chu, Bob Campbell, Franz Alt, Tom ?, and Grace Murray Hopper
Date:	August 14, 1972
Repository:	Archives Center, National Museum of American History
Description:	Transcript, 33 pp.
Abstract:	
Citation:	Computer Oral History Collection, Archives Center, National Museum of American History.
Copyright:	
Transcript:	http://invention.smithsonian.org/ fa_cohc_tr_acm710814.pdf

Smithsonian
National Museum of American History
Lemelson Center for the Study of Invention and Innovation

Computer Oral History Collection, 1969-1973, 1977

Interviewee:	John Vincent Atanasoff
Interviewer:	Uta C. Merzbach
Date:	May 5, 1969
Repository:	Archives Center, National Museum of American History
Description:	Transcript, 62 pp.

Abstract: (This interview has some pagination problems and was conducted in three parts. The last two parts are not paginated, but appear to be a continuation of a discussion with Atanasoff for May 5, 1969.)

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

Transcript: http://invention.smithsonian.org/downloads/fa_cohc_tr_atan690505.pdf

Smithsonian
National Museum of American History
Lemelson Center for the Study of Invention and Innovation

Computer Oral History Collection, 1969-1973, 1977

Interviewee: John Vincent Atanasoff
Interviewer: Uta C. Merzbach
Date: 1969
Repository: Archives Center, National Museum of American History
Description: Transcript, 33 pp.

Abstract:

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

Transcript: http://invention.smithsonian.org/downloads/fa_cohc_tr_atan690000.pdf

Smithsonian
National Museum of American History
Lemelson Center for the Study of Invention and Innovation

Computer Oral History Collection, 1969-1973, 1977

Interviewee:	John Vincent Atanasoff
Interviewer:	Henry Tropp
Date:	February 18, 1972
Repository:	Archives Center, National Museum of American History
Description:	Transcript, 12 pp.

Abstract: Interview begins with a discussion of Atanasoff's views on the history of computing, the contributions that were most significant, and their role in the development of ideas. Atanasoff expresses his historical activities in the field and relates them to what he thought the current ideas in computing machines were. The Atanasoff-Berry computing machine was a very early activity and idea that was original in the sense that it was done alone. Atanasoff recalls his years in high school, college, and graduate school and the individuals he met while in school who contributed to his early understanding of mathematics and physics, and development of ideas. Discusses his use of the Monroe Calculator and its influence and enhancement of his interest in computing machines. Atanasoff concludes with discussion of his development of a pertubation method in term of calculus variations. This was an attempt to depict the atom in terms of a principal in the calculus of variations. Individuals mentioned: J.W. Woodrow, John Sidney Turner, P.T., Robinson, Henry Wallace, Prof. Snedicker, A.E. Brant, R.A. Fisher.

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

Transcript: http://invention.smithsonian.org/downloads/fa_cohc_tr_atan720218.pdf

Computer Oral History Collection, 1969-1973, 1977

Interviewee:	John Vincent Atanasoff
Interviewer:	Henry Tropp
Date:	April 17, 1972
Repository:	Archives Center, National Museum of American History
Description:	Transcript, 29 pp.

Abstract: The subject of this interview is the motivation and pressure to develop high speed computation devices. Atanasoff begins by discussing his work in the fall of 1930 as an assistant professor of mathematics at Iowa State College. Beginning in 1932, Atanasoff began teaching graduate courses to those who were interested. The courses Atanasoff taught represented a new phase in the broad field of mathematical physics. He comments on several of the courses he taught: Dynamics, Mechanics, Thermodynamics, Kinetic Theory, and Quantum Mechanics. Because of Atanasoff's course load, he had numerous masters' theses and Ph.D's written under his direction. These theses included such topics as: crystal dynamics, quantum mechanical depiction, state of lithium, approaches to the solution of problems in infinite algebra, and solution of elastic problems. All of Dr. Atanasoff's students worked on problems in the area of mathematical physics. Comments on the differences between anisotropic and isotropic and the differential analyzer. Discussion of what types of computing machines were available at Iowa State College during the 1930s for solving problems. Atanasoff used a Monroe Calculator, IBM tabulator, or solved problems by hand. Persons mentioned include Pam Dirac and Arnold Summerfeld.

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

Transcript: http://invention.smithsonian.org/downloads/fa_cohc_tr_atan720417.pdf

Smithsonian
National Museum of American History
Lemelson Center for the Study of Invention and Innovation

Computer Oral History Collection, 1969-1973, 1977

Interviewee: John Vincent Atanasoff
Interviewer: Henry Tropp
Date: April 24, 1972
Repository: Archives Center, National Museum of American History
Description: Transcript, 13 pp.

Abstract: This interview is a continuation of discussions with Atanasoff from previous dates. The conversation begins with the need for more powerful computing means related to the solution of large systems of linear, algebraic equations. He comments on the pressure to solve these equations, to make the IBM Tabulator solve the systems of equations, and for the Monroes to solve them. Both machines did not possess the computing capacity. Although the machines did not have the computing capacity, they did serve to develop the logic and the rationale by which the machine would work if it had the capacity. Atanasoff began thinking about using conventional equipment and adapting it to his needs in 1935-1936. He sought a computational means and at a cheaper cost. Turning away from the single purpose machine, Atanasoff focused exclusively on computational means and basic devices for computing. This led Atanasoff to examine (conducting primarily a literature review) all computing machines that had been constructed and to commence devising his own machine. Discusses his use of lower bases, other than ten. Atanasoff rationalized that there might be two number systems in use in the world, the base two and the base ten system. During the course of this work at Iowa State College, Atanasoff talked only with his graduate students about the problems he was encountering. The faculty did not appear interested. The use of vacuum tubes for computing machines is also discussed. Atanasoff could not build his machine without them. The tubes allowed for faster speeds than relays and could continually change their characteristics. The argument between vacuum tubes and relays is presented by Dr. Atanasoff . Comments on the scale-of-two counter which was common in those days. A.E. Brandt is mentioned.

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

Transcript: http://invention.smithsonian.org/downloads/fa_cohc_tr_atan720424.pdf

Smithsonian
National Museum of American History
Lemelson Center for the Study of Invention and Innovation

Computer Oral History Collection, 1969-1973, 1977

Interviewee: John Vincent Atanasoff
Interviewer: Henry Tropp
Date: May 1, 1972
Repository: Archives Center, National Museum of American History
Description: Transcript, 24 pp.

Abstract: The subject of this interview is early thoughts on electronic computation and the building of a prototype. Discussions begin with Atanasoff's feelings about computing facilities at Iowa State College in the fall of 1937/spring 1938 and how he could improve the situation. So, Atanasoff got in his car and drove east towards Illinois where he ended up in a honky tonk place. Here, Atanasoff began thinking carefully and systematically about his computational needs and problems. He comments on those problems and the progress he made while in the honky tonk place. This included: progress on the formulation of a structure of a computing machine, the decision to use condensers for abaci elements, the machine would operate in adding a pair of numbers, and conceived of an electrical circuit. What Atanasoff conceived of was the first electronic digital logic element. Discusses the beginning building process of the machine, his arrangements to stop working on physics and graduate courses, and securing funding for construction around 1939. It was at this time that Atanasoff selected Clifford Berry to assist him and comments on the details and process he and Berry used to begin building a prototype. Mentioned are: George Gross, Clifford Berry, and Harold Anderson.

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

Smithsonian
National Museum of American History
Lemelson Center for the Study of Invention and Innovation

Computer Oral History Collection, 1969-1973, 1977

Interviewee:	John Vincent Atanasoff
Interviewer:	Henry Tropp
Date:	May 11, 1972
Repository:	Archives Center, National Museum of American History
Description:	Transcript, 37 pp.

Abstract: Discussion of Atanasoff's paper on "Generalized Taylor Expansions" presented at the Mathematics Meeting in Columbia, Missouri, in December of 1939. Atanasoff commenced to investigate what the inner essence of the Taylor Expansion was that permitted this simplicity of reminder formulas. He described the essential features of the Taylor Expansion differently than Taylor in terms of operators and functions. Comments on his prototype machine and talks about the details of a five dual triode, and three pentode prototype and how it operated. Also, he discusses his use of Boolean Algebra. The prototype began being tested before Christmas of 1939 to determine if the addition and subtraction were correct. The idea of the "Big Machine" by Atanasoff and Berry began in 1939 too and was completed during 1941. This machine would contain the coefficients of two equations and would eliminate between them and result in an equation of one less independent variable. Comments on the concept of the memory drum—a condenser memory specifically—that would be charged from a plate of a vacuum tube and would itself serve to actuate the grid of the vacuum tube so no application would be necessary. Atanasoff discusses the specifics involved in obtaining condensers and tubes and using them. One of the tubes Atanasoff and Berry began using was the 6CAG. Discusses the Big Machine concept and its ability to solve systems of equations simultaneously. While the machine never solved it, it was able to store and eliminate variable controls. Details of the machines abilities are discussed. Recalls his visit with Howard Aiken at Harvard while touring the east coast in approximately 1944. Atanasoff and Aiken's discussions centered around the advantages of vacuum tubes and relays. Atanasoff comments on the Mark I and how it operated. Conversation shifts back to tests being conducted on the tubes. Atanasoff concluded that any machine would have difficulty with its components. Atanasoff addresses the problem of how many digits he needed to put in
in terms of coefficients of these equations in order to an approximation level that would be acceptable to him. Those mentioned frequently are: Robert Vaile, F.W. Bubb, Warren

Smithsonian
National Museum of American History
Lemelson Center for the Study of Invention and Innovation

Computer Oral History Collection, 1969-1973, 1977

	Weaver, Sam Caldwell, Howard Aiken, R.A. Buchanan.
Citation:	Computer Oral History Collection, Archives Center, National Museum of American History.
Copyright:	
Transcript:	http://invention.smithsonian.org/downloads/ fa_cohc_tr_atan720511.pdf

Smithsonian
National Museum of American History
Lemelson Center for the Study of Invention and Innovation

Computer Oral History Collection, 1969-1973, 1977

Interviewee: John Vincent Atanasoff
Interviewer: Henry Tropp
Date: May 24, 1972
Repository: Archives Center, National Museum of American History
Description: Transcript, 18 pp.

Abstract: This interview addresses questions related to Mauchly, Brandt, Wallace, and Berry. Discussions begin with the topic of weather forecasting and John Mauchly. Atanasoff recalls his meeting with Mauchly in 1940 at an AAAS Meeting where Mauchly was presenting a paper on analog computers. More specifically, it concerned analog computation and the [Fourier?] analyzer. This represented the only connection between Mauchly and weather that Atanasoff knew of. While at the AAAS Meeting, Atanasoff had conversations with Mauchly about his Atanasoff-Berry Computer (ABC) machine (the larger machine), the prototype, the chassis being built, and units being constructed. Mauchly indicated a keen interest, but did not tell Atanasoff of any interest or activity on his part in creating a digital machine. Atanasoff and Mauchly however did correspond with each other and this correspondence culminated in a visit by Mauchly to Iowa in 1941. The visit included a tour of Atanasoff's computing laboratory where Mauchly saw the computing machine for the first time. During that visit, Mauchly saw the machine operating by some kind of jury-rigging and the input of numbers into the machine so the machine could do an arithmetic operation. It was not till after Mauchly's visit in 1941 that he became active in computing machines. Mauchly would subsequently go on to invent the ENIAC which handled ballistic computations. Atanasoff too, would work on a military related project at Iowa State College concerning extrapolation for anti-aircraft purposes. Comments on the relationship he shared with Henry Wallace and A.E. Brandt in terms of the Iowa State University campus. Henry Wallace had activities related to statistics in the Agriculture Department which Brandt took an interest in. Brandt was actually the link between Atanasoff and Wallace. Wallace had a strong influence with the Dean of Agriculture and noted that statistics were important. Those mentioned frequently include: Henry Wallace, A.E. Brandt, R.A. Buchanan, and Sam [Leipolds?].

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

Computer Oral History Collection, 1969-1973, 1977

Smithsonian
National Museum of American History
Lemelson Center for the Study of Invention and Innovation

Computer Oral History Collection, 1969-1973, 1977

Interviewee:	John Vincent Atanasoff
Interviewer:	Henry Tropp
Date:	June 7, 1972
Repository:	Archives Center, National Museum of American History
Description:	Transcript, 23 pp.

Abstract: This interview concerns biographical information about Clifford Berry, the graduate assistant that Atanasoff selected to work on the computing machine. Berry, born in 1918, completed a degree in physics from Iowa State College in 1939. He later earned a MS in Physics from Iowa State College, 1941 and then his Ph.D. in physics from the same school in 1948. Atanasoff recalls that Berry was reasonable, rational, and systematic in his efforts. Berry was recommended to Atanasoff by then Professor of Electrical Engineering at Iowa State College, Dr. Harold Anderson. Berry had had several conversations with Atanasoff about the machine and what direction he was progressing in 1938, almost a full year prior to his officially joining Atanasoff in the fall of 1939. Berry was an able mechanic who could manipulate many things and who could work without drawings. Important contributions of Berry's prompted Atanasoff to draw up a patent contract regarding the ABC Machine. The ABC Machine—an aspect of the main machine—also acted as Berry's master's thesis topic. The principle thing that Cliff Berry worked on was an input/output device which was to be employed for that machine in a similar way to what magnetic recordings use today, a slow memory. This device for slow memory is a base two card system. By 1942, the largest problem facing Berry was the draft. At the same time, Berry also received an attractive offer from a company based in Pasadena, California. In the summer of 1942, Berry left Iowa and Atanasoff. Berry's new employer was Consolidated Engineering and he worked primarily on mass spectrographs until his death in 1963. Atanasoff then began working on a classified project for the Naval Ordnance Laboratory related to matters of anti-aircraft fire control. The question was how to handle telescopes so that it could be trained on a moving object and give you the best data on the location of the object and how this data could then be processed to direct the anti-aircraft fire. Atanasoff comments in great detail on this project and discusses radar which was just emerging from England. Individuals mentioned are Harold Anderson and Jean Reid.

Computer Oral History Collection, 1969-1973, 1977

Smithsonian
National Museum of American History
Lemelson Center for the Study of Invention and Innovation

Computer Oral History Collection, 1969-1973, 1977

Interviewee:	John Vincent Atanasoff with Alice Atanasoff
Interviewer:	Bonnie Kaplan
Date:	July 17, 1972
Repository:	Archives Center, National Museum of American History
Description:	Transcript, 44 pp.

Abstract: Discussion of Clifford Berry's contributions to the creation of the machine. Berry had taken Atanasoff's logic circuit for the machine and put it into practical electronic form and invented a new circuit or two. Berry and Atanasoff worked together on almost every aspect of the machine, but Berry did develop a newer circuit that contained five dual triodes. He also took complete charge of the construction features and assembly of the machine and lent an emotional support to Atanasoff. Comments on the development of a theory of how digital computing machines worked. Berry and Atanasoff examined a mechanical computing machine controlled by parameters and how the parameters change and how the machine will continue to compute until the parameters have changed too much. This led Atanasoff to think that the same was true for electronic machines. All electronic machines will work through a range of parameters. Further discussion ensues regarding the variations in seven tube circuit over the eight tube circuit. Briefly remarks on A.E. Brandt and his moral support for Atanasoff's efforts at Iowa State. Although Brandt did not understand the technical aspects of the project, he was able to get parts for Atanasoff. While Atanasoff had Brandt's support, he had few people at Iowa State with whom he could discuss his work and this affected his work. Atanasoff notes that the war years were difficult, the United States had come under great pressure and the general feeling was to do everything possible to enhance national security and defense. Atanasoff would join in 1945 the Navy's computer project at the Bureau of Ordnance (Naval Ordnance Laboratory). Atanasoff began to build upon his previous work for a new computing machine that included new kinds of memory and he entered a new phase of electronic switching—a cathode ray tube as memory. The Navy dropped the project in late 1946, but Atanasoff still held a great interest in computing machines. Atanasoff remarks that his ideas were more advantageous than those of others, specifically his logic circuit. Although Mauchly and Eckert had used a logic circuit too, Atanasoff notes that the litigation record will show evidence of the original idea resting with him. Other ideas of Atanasoff's that were used by others

include: the scale of two, regenerative memory, and sequential calculations. Atanasoff comments on Mauchly and Eckert, the litigation, and his feelings about not being associated with the Electronic Numerical Integrator and Automatic Computer (ENIAC). He thought the ENIAC was not a very effective machine, did not like its results, and its insufficiency. His feelings were similar for the MARK I. These machines would not have served the ends for which Atanasoff was striving. Atanasoff became involved with the Crossroads Project, the first atomic explosion after the war in the Bikini Atoll. On this project he planned the instrumentation. In 1947, Atanasoff would do another instrumentation job—electronic—in Europe for an explosion at Helgoland in North Germany. Discusses his founding of a private company, Ordnance Engineering Corp. Those mentioned frequently include: Calvin Morse, Dave Beecher, Clifford Berry, A.E. Brandt, Bob Elbern, Ernest Coltrud, David Barbrough, Dr. Lynn Rambough, and George Gross.

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

Transcript: http://invention.smithsonian.org/downloads/fa_cohc_tr_atan720717.pdf

Smithsonian
National Museum of American History
Lemelson Center for the Study of Invention and Innovation

Computer Oral History Collection, 1969-1973, 1977

Interviewee: John Vincent Atanasoff
Interviewer: Bonnie Kaplan
Date: August 10, 1972
Repository: Archives Center, National Museum of American History
Description: Transcript, 52 pp.

Abstract: The conversation begins with Atanasoff's method of adding and counting—an idea he conceived of while in a honky-tonk bar in Illinois in 1937. This concept of addition was to be performed by logic and not by successive inching of a dial. Atanasoff further remarks that his interest in electronic computation began by thinking along the Eccles-Jordan lines. The Eccles-Jordan circuit was used for part of the operation and intended to do successive impulses. Further comments about the Eccles-Jordan circuitry are made. The use of vacuum tubes in Atanasoff's machine was prompted be economy. Vacuum tube circuits were fast enough to solve the sums of all digits and thus economize on time and material. The use of base two for arithmetic was employed because it was simpler. The use of dual triodes (6F8G and then ultimately the 6C8G) in the circuitry was also based on economy--original cost and space. The difference between these two tubes is discussed. Comments on the machines ability to do subtraction using [Comptu's ?] complements. Atanasoff decided to use the complements in the memory in order to subtract. This use of complements was not original to Atanasoff. Atanasoff explains his use of lower base numbers opposed to larger. The simplest way of storing numbers up to 25 is by coding them into numbers probably with a base of two. Numbers associated with the base of two were associated with a simpler logical system. While Atanasoff experimented with larger base numbers, he found them to unsatisfactory. Atanasoff discussed his decision to use base two with George Gross and William Mercer who did the calculations which were needed for the base ten- base two conversion table. While doing the conversions on the machine, the addition was automatically carried out in the computing machine. Atanasoff explains the concept of a floating grid. This type of grid implied that it did not have a bias resistor to the ground, it was not connected. Normal grids in vacuum tubes are connected to the ground. Another of Atanasoff's addition to the machine was the use of a dielectric sheet to record the base two numbers. The dielectric had difficulty working since Atanasoff could never find a satisfactory paper on which to record the readings. Atanasoff

discusses his desire to have worked for IBM despite the rebuffs he had received over the years. He notes that he wanted to be more in the mainstream of the development of computers with funding, and the possibilities of research. IBM seemed to provide the best possible future for computing. This transcript concludes with several miscellaneous questions based on the court transcripts from the litigation Honeywell vs. Sperry-Rand. Individuals mentioned include: Ernest Anderson, Clifford Berry, George Gross, James Elder, Norman Fulmer, and Hazeltine.

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

Transcript: http://invention.smithsonian.org/downloads/fa_cohc_tr_atan720810.pdf

Smithsonian
National Museum of American History
Lemelson Center for the Study of Invention and Innovation

Computer Oral History Collection, 1969-1973, 1977

Interviewee: John Vincent Atanasoff
Interviewer: Bonnie Kaplan
Date: August 16, 1972
Repository: Archives Center, National Museum of American History
Description: Transcript, 20 pp.

Abstract: Interview begins with Atanasoff's biographical information from 1941 to 1942. Atanasoff outlines the situation as it existed in 1942 with Cliff Berry, World War II, and the status of the machine. The focus of the work was the development work necessary to make the base two recorder work dependably and the base two punch and the base two reader work reliably. When Cliff Berry left Iowa for California in 1942, Atanasoff also left Iowa to begin work with the Naval Ordnance Laboratory (NOL) in Washington, DC. At NOL, Atanasoff worked on pressure mines, and later acoustic mines. This worked involved the improvement of mines, working out detailed designs, and testing them. In 1943 John Mauchly paid Atanasoff another visit, this time at NOL. He subsequently took a position at NOL and also continued his work on computing machines at the Moore School. By 1945, NOL had moved to a new facility in White Oak, Maryland. At this time Atanasoff was a director with a large staff directing fundamental work in acoustics leading towards the development of mining and/or other devices necessary for the Navy. Atanasoff would subsequently receive the Distinguished Civilian Service Award for his work for the Navy. By November of 1945, NOL had proposed that a computing machine project begin. Atanasoff became the head of this project. Atanasoff spoke with John von Neumann regarding his work at NOL on the computing machine. These discussions centered on the theories of computing machines. The Navy hoped that this computing machine would be a general computer. During the computing machine project, the Crossroads Project surfaced and Atanasoff and his staff had to travel to the Pacific for the first atomic test. Their contribution was to test the air and water waves. Because of his work on the Crossroads Project, Atanasoff was asked to join the Helgoland Project in Germany. Again, Atanasoff was to measure the forces of these explosions at distances reaching from five to ten to a thousand kilometers. This work with atomic explosions laid the foundation for long-range detection of atomic bombs. Those mentioned frequently include: Warren Weaver, Cliff Berry, William Stone, John Mauchly, Dr. Ellis Johnson, Herman Ellingsen, A. E. Brandt, Calvin Morse, David [Beecher?] Ernest

Smithsonian
National Museum of American History
Lemelson Center for the Study of Invention and Innovation

Computer Oral History Collection, 1969-1973, 1977

[Cohurd?], David [Brop?], John von Neumann, and Meryl Tuve.

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

Transcript: http://invention.smithsonian.org/downloads/fa_cohc_tr_atan720816.pdf

Smithsonian
National Museum of American History
Lemelson Center for the Study of Invention and Innovation

Computer Oral History Collection, 1969-1973, 1977

Interviewee:	John Vincent Atanasoff
Interviewer:	Bonnie Kaplan
Date:	August 23, 1972
Repository:	Archives Center, National Museum of American History
Description:	Transcript, 134 pp.

Abstract: Dr. Atanasoff responds to miscellaneous questions pertaining to specifics in previous interviews or testimony he gave. Topics include, but are not limited to the following: solution of system of linear equations by Atanasoff's computer, broad notions of the computer as a brain, contributions of support staff at Naval Ordnance Laboratory (NOL), magnetic disk vs. cathode ray tube memory, level of support for the computing project at NOL, motivation for work on complex spectranalysis, motivation for choosing digital approach, motivation for changing from mathematics to physics to name a few. Names mentioned include Thornton Fry, Warren Weaver, Howard Aiken, Harold Sexton, Babbge, Borrell, and Borin.

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

Smithsonian
National Museum of American History
Lemelson Center for the Study of Invention and Innovation

Computer Oral History Collection, 1969-1973, 1977

Interviewee: John Vincent Atanasoff
Interviewer: Bonnie Kaplan
Date: August 28, 1972
Repository: Archives Center, National Museum of American History
Description: Transcript, 20 pp.

Abstract: The subject of this interview concerns biographical information from 1947 to 1972; additional information regarding the Helgoland explosion; Naval Ordnance Laboratory's (NOL) Research Department and Acoustics Division, testing and long-range projects; Army Field Forces--testing of vehicles and tanks; the Navy Fuse Program; Ordnance Engineering Corporation; Atlantic Division of Aerojet General; consulting; and cybnetics.

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

Transcript: http://invention.smithsonian.org/downloads/fa_cohc_tr_atan720828.pdf

Smithsonian
National Museum of American History
Lemelson Center for the Study of Invention and Innovation

Computer Oral History Collection, 1969-1973, 1977

Interviewee:	William F. Atchison
Interviewer:	Richard R. Mertz
Date:	October 6, 1970
Repository:	Archives Center, National Museum of American History
Description:	Transcript, 65 pp.

Abstract: William Atchison, born in Smithfield, Kentucky, in 1918, obtained his A.B. in mathematics and chemistry from Georgetown College in Georgetown, Kentucky, in 1940. He earned a master's degree in mathematics from the University of Kentucky in 1940 and continued his studies of algebraic geometry at the University of Illinois, where he obtained a Ph.D. in 1943. After teaching V-12 students early in World War II, Atchison was drafted into the Navy, eventually becoming the officer in charge of the educational programs offered servicemen in Guam. Atchison returned to teach mathematics at Illinois after the war. The Illinois Automatic Computer (ILLIAC) was built while he was on sabbatical at Harvard. When he returned in 1951, he began to sit in on computer courses. He began writing programs for physical chemists, then, in 1955, left Illinois for the Georgia Institute of Technology. Soon he was head of the computer center there, working first with a Universal Automatic Computer (UNIVAC) 1101, trying an NCR ElectroData computer briefly, and then switching to an IBM 650. Later machines he used in Georgia included a Burroughs 220 and a Burroughs 5000 (later a Burroughs 5500). Atchison was actively involved in numerous aspects of computer education, persuading faculty members to use his facilities, teaching courses in the mathematics department and then the school of information sciences, and working with curriculum committees of the ACM. In 1966, he left Georgia to become a professor of computer science at the University of Maryland. There he has not only taught graduate students but worked on a textbook and on an international committee on computer education in secondary schools.

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

this source is cited.

Computer Oral History Collection, 1969-1973, 1977

Interviewee: Isaac Auerbach
Interviewer: Henry Tropp
Date: February 17, 1972
Repository: Archives Center, National Museum of American History
Description: Transcript, 40 pp.

Abstract: Auerbach, born in 1921, attended Drexel University and completed an M.S. at Harvard in 1947. He then went to work for Eckert and Mauchly in what became the Univac Division of Sperry Rand. He describes his work there on the Binary Automatic Computer (BINAC). He also reports on von Neumann's perception of the importance of the Magnetic Drum Digital Differential Analyzer (MADDIDA), the reluctance of Northrop to build the machine, and the subsequent formation of the Computer Research Corporation. Auerbach himself had no part in the design of the MADDIDA. In 1949 he left Sperry Rand for the Burroughs Corporation and then, in 1957, started his own firm. Auerbach discusses the origins of the Computer History Project and his concern that in the development of computers and other technologies, ideas are communicated among people, not through published literature. Hence oral histories are especially important. He mentions numerous people who made important contributions to the history of computers, not only in the United States, but in Germany and England. Especially prominent in his account are J.V. Atanasoff, P. Eckert, J.W. Mauchly, and John von Neumann.

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

Computer Oral History Collection, 1969-1973, 1977

Interviewee:	Jean J. Bartik & Frances E. (Betty) Snyder Holberton
Interviewer:	Henry Tropp
Date:	April 27, 1973
Repository:	Archives Center, National Museum of American History
Description:	Transcript, 216 pp.

Abstract: Interview begins by discussing how Bartik and Holberton became involved in Electronic Numerical Integrator and Automatic Computer (ENIAC) in terms of their arrival at the University of Pennsylvania's Moore School and work they did during the war years. Jean Bartik graduated from North West Missouri State Teachers College with a degree in math. In 1945, after graduation, she traveled east to the University of Pennsylvania's Moore School where they were hiring mathematicians. Holberton started with the Eckert Mauchly Computer Corporation in the late 1940s and later worked for Remington Rand after it purchased Eckert Mauchly Corporation. At the Moore School, Bartik joined Holberton and others to work on ballistics calculations, but soon became disinterested in the work. Both Holberton and Bartik volunteered to work with the ENIAC and in doing so, met John Mauchly. The first step in working with the ENIAC was to send the group to Aberdeen to learn all the tab equipment for the IBM 405. Holberton became interested in what the 405 was like internally and eventually received permission to draw a diagram so a person could work on the machine and learn how it worked. This actually began the process of developing a machine program. Upon their return to the Moore School, Holberton and Bartik began learning block diagrams for the ENIAC and taking courses taught by Adele Goldstine and Mary Mauchly. They discuss their problems associated with programming the ENIAC for certain problems, like repeating only certain portions of the program, and drawing diagrams. They comment on developing the phrase "breakpoint" from pulling a wire to stop the program so the accumulators could be read. The point was actually broken so it could be read. They discuss the first demonstration of a trajectory problem on the ENIAC and the reactions to it. Subsequent problems run on the ENIAC began from scratch, but also benefited from a repertory of preceding techniques. Each time a new problem was run on the machine, the individual running the problem had to learn how to operate the machine and put their own problem on it. Large problems were not handled well by ENIAC. Most problems were broken down into smaller portions and then assigned to two

people, one who knew the machine, and the other who knew the problem. They recall meeting John von Neumann—a consultant regarding instruction codes—when they were programming, transferring, and translating ENIAC from a parallel machine to a serial machine. They comment at length about von Neumann and discuss the idea of programming and programmers, and the attitude that mathematicians were well suited to this task because mathematicians could understand the problem.

The second portion of the interview addresses the real change in the computational environment that ENIAC created. Bartik comments on John Mauchly and how he was a stimulus for others to use their heads and to have fun with their problem solving. Mauchly's influence is considered significant, especially his ability to stimulate others and get excited about computing. J. Presper Eckert also contributed to Bartik's and Holberton's intellectual growth by encouraging and impressing upon them that anything is possible and that there are always alternatives. The communication of Mauchly and Eckert attracted a tremendous group of talent people to the company. They discuss the change in the computer environment in 1955 with the development of Universal Automatic Computer (UNIVAC I), the first commercial processing machine. Holberton comments on the first sorting problem in June 1947. Holberton and Bartik recognized early that to make machines practical in the commercial sector, it would have to perform mundane tasks on large amounts of data. Two major problems arose: developing a storage medium that could handle the volumes of data, and determining how it would sort. Emphasis was placed on the tape system as having a means of storing information cheaply and being able to read it quickly. Holberton and Bartik ultimately devised the first sort-merge generator for the UNIVAC I. Colleagues mentioned include: John Mauchly, Bob Shaw, Harry Huskey, Adele Goldstoine, John Holberton, J. Presper Eckert, Stan Frankel, Nicholas Metropolis, Dick Clippinger, Ida Rhodes, Abe Taub and countless others.

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

Transcript: http://invention.smithsonian.org/downloads/fa_cohc_tr_bart730427.pdf

Smithsonian
National Museum of American History
Lemelson Center for the Study of Invention and Innovation

Computer Oral History Collection, 1969-1973, 1977

Interviewee: Walter Bauer
Interviewer: Lecture
Date: June 12, 1972
Repository: Archives Center, National Museum of American History
Description: No transcript

Abstract:

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

Smithsonian
National Museum of American History
Lemelson Center for the Study of Invention and Innovation

Computer Oral History Collection, 1969-1973, 1977

Interviewee:	Walter Bauer
Interviewer:	Robina Mapstone
Date:	May 14, 1973
Repository:	Archives Center, National Museum of American History
Description:	Transcript, 56 pp.

Abstract: Walter Bauer, born in 1924, attended the University of Michigan, completing a Ph.D. in mathematics in 1951. In January that year he began working under Henry Goode and with John Carr at the university's Willow Run Research Center. The Center was building guidance systems for the Boeing and Michigan Aeronautical Research Center (Bomarc) missile. They first used the Standards Eastern Automatic Computer (SEAC) and then built a digital mercury delay line computer, the Michigan Digital Automatic Computer (MIDAC), which was on the pattern of the SEAC but had an index register. John DeTurk was in charge of hardware. The engineers at Willow Run also built the Michigsn Digital Special Automatic Computer (MIDSAC), a prototype guidance computer intended for real time control, often Bomarc missiles. In 1954, Bauer went to Ramo-Wooldridge as head of the computing center. This California firm was coordinating technical aspects of the construction of intercontinental ballistic missiles. At Ramo-Wooldridge Bauer's group wrote software to simulate the flight of an ICBM and worried about specific problems such as missile heating at high altitudes. They also simulated the first moon probe and designed computer control for traffic lights. Early computations were done on a UNIVAC computer that had somewhat unreliable Bull input/output devices. Others at Ramo-Wooldridge built airborne digital control computers and process computers. Bauer played an active role in the Association of Computing Machinery. He attended his first meeting in 1951, became chairman of the Los Angeles chapter in 1958, and served as chairman of the editorial board during the l960s, persuading Jack Carr to become editor of the new journal Computing Reviews. He also served on the Council and was nominated but not elected for the Presidency. In 1956 Frank Wagner started *Data Link*, the newsletter of the Los Angeles chapter of the Association for Computing Machinery (ACM). In l962, Bauer and some of his acquaintances founded Informatics, an early software company. The market for new software grew more slowly than expected. Bauer comments on several early computers, the role of the National Bureau of Standards in encouraging computer

development, early types of computer memory, and the early cathode ray tube output id time-sharing systems developed by the defense industry. He describes early computer demonstrations, especially playing pool on the MIDSAC. John Carr is mentioned several times.

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

Computer Oral History Collection, 1969-1973, 1977

Interviewee:	Allan Beek, Ted Hertz, and David Feign
Interviewer:	Robina Masptone
Date:	April 4, 1973
Repository:	Archives Center, National Museum of American History
Description:	Transcript, 83 pp.

Abstract: (This interview has three participants, Allan Beek, Ted Hertz, and David Feign. Each participant introduces himself and briefly comments on his academic background and contributions to the field. Later discussions contain detailed information, but are scattered.)

Beek graduated in 1950, from Cal Tech with a degree in physics. He took mathematics courses at UCLA for one year before accepting a position with Northrop. At Northrop, Beek went to work on the Magnetic Drum Digital Differential Analyzer (MADDIDA) Project in the summer of 1951. Beek discovered that by using the new "y" instead of the old "Y" in performing integration, one could eliminate a large part of the second order error. After Northrop was bought by Bendix, Beek went with Logistics Research where he helped build the first Axel Wenner-Gren Automatic Computer (ALWAC), a GP. From Logistics Rsearch, Beek joined Electrodata which later became Burroughs. At Burroughs he did the logic design for their first magnetic tape unit and then returned to Logistics Research. During Beek's second stay at Logistic, he worked on the programming for the ALWAC-III E. Beek would later join Lockheed for a short period and consult for North American. At North American Beek focused on the analysis of differential analyzers or Digital Differential Analyzer (DDA) type processors, but mainly he concentrated on general purpose computer architecture.

Hertz graduated from the City College of New York in 1940, with a B.S. in Math. In 1950, Hertz received his M.S. in Math from New York University. Hertz then went to work for the Air Force as a civilian instructor during World War II. From approximately 1945 to 1948, Hertz became an instructor in college physics at the New York College of Engineering. After teaching, Hertz joined Remington Rand as a tech writer to write a catalog of electronic equipment. Hertz continued to do Technical writing for Warner on a instruction manual for an analog computer. This analog computer was associated with a radar system that was being developed by

Bell Labs. Later, Hertz would be given the opportunity to work the Universal Automatic Computer (UNIVAC) I and with programming digital computers. In 1952, Hertz accepted a position with North American in California to do programming for a computer then under construction, the North American Tape Preparation Automatic Computer (NATPAC). The function of the computer was to share tapes for a star tracker that was used on the SNARK missile. The Rome Air Development Center became interested in a transistorized version of NATPAC which was a vacuum tube computer. Hertz designed a transistorized general purpose computer. This general purpose computer was called RECOMP, Reconnaissance Computer and was delivered in 1956. Comments at length about RECOMP-I and RECOMP-II.

David Feign graduated from the City College of New York in 1944 with a degree in mechanical engineering. Upon graduation, Feign went to work for the National Advisory Committee for Aeronautics (NACA), the predecessor to the National Aeronautics and Space Administartion (NASA). His specialty was dynamic stability of airplanes. Feign ultimately left NASA for the Cornell Aero Lab in Buffalo, New York. At Cornell, Feign encountered the IBM 602 and 601 multipliers that were used for internal data reduction. Feign joined Lynn Renaldi to set up a wind tunnel data reduction procedure. This project actually consisted of wiring up plug boards which translated into having a relay calculator with programs on cards and a full complement of memory available. Comments at length about tunnel experiments, specifically on-line wind tunnel data reduction in which Feign programmed the computer to accept data and put out the results. The computer Feign used to program was ElectroData's Datatron-204. Briefly comments on IBM's 704 and the UNIVAC. Names mentioned include Lester Kilpatrick, Herb Grosch, Ed Berkeley, Floyd Steele, and Glen Hagen.

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

Smithsonian
National Museum of American History
Lemelson Center for the Study of Invention and Innovation

Computer Oral History Collection, 1969-1973, 1977

Interviewee:	Morton Bernstein
Interviewer:	Robina Mapstone
Date:	March 14, 1973
Repository:	Archives Center, National Museum of American History
Description:	Transcript, 60 pp.

Abstract: Mort Bernstein was born in 1927. He learned to operate a desk calculator, the Comptrometer, in the Navy and was introduced to data processing which influenced him to major in math at the University of Pittsburgh where he earned a MA in math. At Pittsburgh, Bernstein held a teaching assistantship in the School of Public Health and Department of Biostatistics where he ran a small punch card lab for use in statistical analysis. This punch card machine was later replaced by an IBM statistical cylinder (IBM 101). Bernstein and another colleague at Pittsburgh became the demonstration center for IBM because of their ability to operate the machine. This prompted Bernstein to begin examining automatic computation. After graduating from the University of Pittsburgh, he took a job at the Pentagon with the University Project. This project was not related to computing and he left after only seven months. The project did however, expose him to three things: early LP Codes using Dantzig's simplex methods to module, exposure to the Universal Automatic Computer (UNIVAC), and an educational opportunity to take graduate classes at the Graduate School of the Department of Agriculture. Bernstein comments that in 1952, he registered for a graduate class titled "An Introduction to Electronic Digital Computers" taught by Dr. Edward Cannon and then subsequently taught by Ida Rhodes. He recalls Ida Rhodes and her ability to teach. Discusses his employment search and experience with the United States Employment Service which yielded an interview at Arlington Hall with the National Security Agency. He briefly describes the IBM 701 and its different architecture from the UNIVAC. Bernstein ultimately did not accept the position at Arlington Hall, but interviewed with RAND in October of 1954 for a programmer trainee position. He joined the company's Numerical Analysis Department where he wrote a program for the integration on the set of partial differential equations to solve. Comments on the assemblers RAND was using at the time, the Douglas, Los Alamos, IBM, and one program Cliff Shaw wrote. He also provides commentary about the atmosphere at RAND. Describes his work for Bill Orchard-Hayes doing linear programming and his

responsibilities working with the John von Neumann Integrator and Automatic Computer (JOHNNIAC) in 1961. With JOHNNIAC, Bernstein was responsible for the interface between users and the people who built and maintained it. Interview highlights include the interest in vertical and horizontal languages, especially the FORmula TRANslator System (FORTRAN), the formation of ALGOLrithmic Language (ALGOL), and his involvement with the groups the Society to Help Avoid Redundant Effort (SHARE) and the Project for Advancement of Coding techniques (PACT). Individuals mentioned include: John Backus, Edward Cannon, Ida Rhodes, Tom Steele, Paul Armer, Jimmy Wong, Cliff Shaw, Mario Juncias, George Dantzig, Philip Wolfe, Herman Kahn, Joe Wegstein, Jules Schwartz, Bill Orchard-Hayes, Frank Wagner, Al Perlis, and Julian Breen.

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

Transcript: http://invention.smithsonian.org/downloads/fa_cohc_tr_bern730314.pdf

Computer Oral History Collection, 1969-1973, 1977

Interviewee:	Julian Bigelow
Interviewer:	Richard Mertz
Date:	January 20, 1971
Repository:	Archives Center, National Museum of American History
Description:	Transcript, 50 pp.

Abstract: Julian Bigelow graduated from the Massachusetts Institute of Technology's (MIT) Communications Engineering Branch in 1935? Upon graduation Bigelow went to work for Sperry Corporation working with various kinds of instruments, particularly instruments for recording the condition of railroad tracks. In 1938-1939, Bigelow went to work for IBM in Endicott, New York where he met Howard Aiken. At IBM, he worked on electromechanical machines. Bigelow left at the onset of World War II with intentions of enlisting. However, in 1940, he returned to MIT to work with Norbert Wiener as a research associate working on a classified military program—computational methods of predicting airplane curved flight from data observed by ground observation instruments. During this period Bigelow also invented and built a variety of curved flight tracking computers and designed a special electrical computer which was intended to do autocorrelations, multiple autocorrelations at high speed in a step wise continuous variable digital fashion. In 1943, he joined the Applied Mathematics Panel of the National Defense Research Council, Applied Mathematics Group at Columbia University as Associate Director of the Statistical War Research Group. By April 1946, Bigelow decided to join John von Neumann (whom he had met on a brief visit to Columbia) at Princeton's Institute for Advanced Studies where von Neumann was working on developing and building a really modern computer, the Institute Machine. Discussed are the various individuals attached to the project—von Neumann, Shore, Davis, Simms, Goldstine, Burkes, Pomerene, Ware, Slutz, and Snyder—and their relationship with the Eckert-Mauchly Group and the Moore School of Engineering. Bigelow reports on the assembling of the team to do logic work, where they set up the lab, building the machine from surplus materials. Comments on other significant and historic projects occurring at the same time—Automatic Computing Engine (ACE) Project, MARK II, Stored Sequence Electronic Computer (SSEC), Whirlwind and centers throughout England. Bigelow also discusses his personal opinions of von Neumman and Wiener. Several colleagues are mentioned: Howard Aiken, F.J. Murray,

Computer Oral History Collection, 1969-1973, 1977

Harold Hotelling, John von Neumann, J. Presper Eckert, Willis Ware, Ralph Slutz, Richard Snyder, Alexander Rufus Applegarth, Jan Rajchman, Abraham Wald, Jay Forrester, Leon Harmon, Cy Wong, and J. Robert Oppenheimer.

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

Transcript: http://invention.smithsonian.org/downloads/fa_cohc_tr_bige710120.pdf

Smithsonian
National Museum of American History
Lemelson Center for the Study of Invention and Innovation

Computer Oral History Collection, 1969-1973, 1977

Interviewee: Gertrude Blanch
Interviewer: Henry Tropp
Date: May 16, 1973
Repository: Archives Center, National Museum of American History
Description: Transcript, 33 pp.

Abstract: Blanch, born in Poland in 1897, obtained her B.S. from New York University and, in 1935, her Ph.D. in mathematics from Cornell. Her thesis concerned algebraic geometry. A few years later Arnold Lowan persuaded her to leave an office job to join the Works Progress Administration's Mathematical Tables Project. In this project, 6 or 7 mathematicians supervised several dozen staff. They used power series to calculate by hand values, several functions. The functions, suggested at the advice of D.H. Lehmer, included ex, the sine, the cosine, and integrals of the sine and cosine. The Mathematical Tables Project was supervised by the National Bureau of Standards (NBS). At the end of World War II, technical staff and computers went to work directly for the NBS. Blanch went to the Bureau's Institute for Numerical Analysis until it closed during the McCarthy era, then to ElectroData, and then, from 1954 until her retirement in 1967, to Wright-Patterson Air Force Base, where she continued her research on Mathieu functions. She comments on the personnel and organization of the various places where she worked, the emphasis in digital computer design on features attractive to business rather than mathematicians, and on diverse colleagues in both New York and California. Those mentioned frequently include Leslie J. Comrie, Ida Rhodes, Frederick G. King, Cornelius Lanczos, D.H. Lehmer and Arnold Lowan.

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

Transcript: http://invention.smithsonian.org/downloads/fa_cohc_tr_blan730516.pdf

Smithsonian
National Museum of American History
Lemelson Center for the Study of Invention and Innovation

Computer Oral History Collection, 1969-1973, 1977

Interviewee:	Richard Bloch
Interviewer:	Henry S. Tropp
Date:	April 12, 1972
Repository:	Archives Center, National Museum of American History
Description:	Transcript, 64 pp.

Abstract: Richard Bloch graduated from Harvard University in 1943. After graduating from Harvard, Bloch went to midshipman training at Notre Dame for the V-7 Program. He later worked at the Naval Research Laboratory where he actually met Aiken for the first time while showing him the laboratory. After meeting Aiken, Bloch became a Naval Officer to the Computation Lab at Harvard and a transfer was arranged in March of 1944. Comments at length about Howard Aiken and his contributions to the computer field.

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

Smithsonian
National Museum of American History
Lemelson Center for the Study of Invention and Innovation

Computer Oral History Collection, 1969-1973, 1977

Interviewee:	James Bradburn
Interviewer:	Robina Mapstone
Date:	February 2, 1973
Repository:	Archives Center, National Museum of American History
Description:	Transcript, 25 pp.

Abstract: Discusses the developments at Consolidated Engineering that contributed to the development of computers and the first computer center. Consolidated Engineering was founded out of United Geophysical and supported two efforts: use of petroleum products from which they made mass spectrometers and link detectors and secondly, the production of recording ocillographs and ancillary equipments. Bradburn was Vice President of Engineering for Consolidated in 1946 and comments on this period when Consolidated was involved in data reaction, a project to build a digital computer making it a decimal, not binary. Cal Tech provided support for this project, particularly Lindvall and Bacher and ultimately Ernst Selmer. Because of funding issues, Bradburn created ElectroData around 1949-1950, split it from Consolidated Engineeering, and offered the stock to the public. The first machine Bradburn's group produced was for the Jet Propulsion Laboratory called "the General Purpose Machine" with a typewriter input/output and big drum memory. Bradburn comments on building the machine and what was added. The second job Bradburn was involved with was a contract for the Stanford Research Institute to build a big banking machine called the Electronic Recording and Machine Accounting (ERMA). By 1955, ElectroData was sold to Burroughs as a wholly owned operation and became a division within Burroughs. Bradburn became Vice President and General Manager of the ElectroData Division which handled all computer operations. Electrodata Division dissolved and Bradburn became vice president of Engineering Manufacturing of which ElectroData was just one division. Comments on the development of the Burroughs 201, 202, 203, 204, and 205. Briefly discusses the computer market and competition they were involved with—IBM, UNIVAC, and Remington Rand. Patents are also discussed. Colleagues mentioned include: George Helmes, Loyd Cali, Ernst Selmer, Stan Frankel, Goldstine, Cliff Berry, Ed McAllister, Henry Tropp, J.B. Rice, L.P. Robinson, and Duncan McDonald.

Citation: Computer Oral History Collection, Archives Center, National

Computer Oral History Collection, 1969-1973, 1977

Museum of American History.

Transcript: http://invention.smithsonian.org/downloads/fa_cohc_tr_brad730201.pdf

Smithsonian
National Museum of American History
Lemelson Center for the Study of Invention and Innovation

Computer Oral History Collection, 1969-1973, 1977

Interviewee: John Brainerd
Interviewer: Uta C. Merzbach
Date: January 8, 1970
Repository: Archives Center, National Museum of American History
Description: Transcript, 8 pp.

Abstract: A native of Philadelphia, Brainerd graduated from the University of Pennsylvania's Moore School of Engineering in 1925 and earned his doctorate there in 1934. Brainerd comments on the Moore School faculty, curriculum, strengths, and weaknesses, and its place among other electrical engineering programs. Discusses the emphasis placed on computing activities and where they originated from at the Moore School. Problems in non-linear circuit systems and problems in time-varying systems were of interest through whole applications in general power fields and in the electronics fields and looking for ways to solve problems and experimentation with small devices. He comments on cooperative arrangement in 1935 with Aberdeen Proving Grounds, the Ballistics Research Laboratory to collaborate on the design on a machine. MIT supplied information on Bush's differential analyzer which Brainerd and his group improved upon. The Moore School funded this project from an endowment. Mentions Irven Travis, Vannevar Bush, John Petley, Miles Nelson, Charlie Wyle, Dr. Pender, and Frank Maginnis.

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

Computer Oral History Collection, 1969-1973, 1977

Interviewee: George W. Brown
Interviewer: Robina Mapstone
Date: March 15, 1973
Repository: Archives Center, National Museum of American History
Description: Transcript, 113 pp.

Abstract: Brown, born in Boston in 1917, was an undergraduate at Harvard and did his graduate work in mathematics at Princeton. During World War II, he worked on a fire control project at Ft. Monroe, Virginia, and at Princeton. From 1944-1946 he was at RCA Laboratories doing function fitting on an analog computer, working on memory devices and logic design, working with Rajchman on switching for the Selectron, and aiding von Neumann and Zworykin in stating the importance of computers for meteorology. He then went briefly to the statistical laboratory at Iowa State University, spending the summer of 1947 as a consultant to RAND Corporation and then, in 1948, leaving Iowa State entirely to work fulltime as a numerical-analyst at RAND. In 1952, Brown joined International Telemeter Corporation, a subsidy of Paramount Pictures that proved most successful at making magnetic core memories for Princeton-type computers as well as for Electronic recording and Machine Accounting (ERMA). This part of International Telemeter eventually split into a separate firm, Telemeter Magnetics, which Paramount sold to Ampex Corporation. Brown soon left to form another company, Data Products. He joined the faculty of the University of California at Los Angeles in 1957 and then, in 1967, became dean of the graduate school of administration at the University of California at Irvine. From 1957 to 1965 Brown directed the Western Data Processing Center (WDPC) at the business school of UCLA. IBM provided this center, as well as the MIT Computation Center in Cambridge, Massachusetts, with its latest equipment free of charge. In return, the centers allowed their machines to be used for a certain amount of research work by IBM employees, allowed other institutions purchasing IBM machines to test programs and, more generally, demonstrated that non-experts could-make use of computers. The WDPC encouraged teleprocessing, eventually establishing links with some 100 educational institutions in the western part of the country. Brown comments on machines ranging from the Card Programmed Calculator to the IBM 709, and refers to numerous colleagues, recalling John von Neumann and John Williams at some length. Others mentioned several times include J.

Smithsonian
National Museum of American History
Lemelson Center for the Study of Invention and Innovation

Computer Oral History Collection, 1969-1973, 1977

Presper Eckert, William Gunning, Cuthbert Hurd, John Mauchly, A. Hood, Jan Rajchman, L. Ridenour, E. Tomash, T.J. Watson, Jr. and V. Zworykin.

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

Computer Oral History Collection, 1969-1973, 1977

Interviewee:	Gordon S. Brown
Interviewer:	Richard L Mertz
Date:	January 27, 1970 and May 28, 1970
Repository:	Archives Center, National Museum of American History
Description:	Transcript, 97 pp. (January 27, 1970) and 57 pp. (May 28, 1970)

Abstract: Gordon S. Brown, born in Drummoyne, New South Wales, Australia, in 1907, took an early job with the state Electricity Commission in Victoria and then, in 1929, came to the United States to enroll as a junior in the electrical engineering department at the Massachusetts Institute of Technology (MIT). Brown spent the rest of his career at MIT, obtaining a master's degree in 1934 and a doctorate in 1938, and then rising through the faculty to become chairman of the department of electrical engineering in 1952. Later, he became dean of the college of engineering from 1959 to 1968. In his first years at MIT, Brown worked as an assistant to Vannevar Bush, operating the differential analyzer. He soon was assisting H.L. Hazen in the design and operation of an automatic curve follower that was exhibited at the 1932 World's Fair. For his doctoral dissertation, Brown designed and built the cinema integraph, an instrument soon superseded by the Rockefeller differential analyzer. In 1939, Brown began to teach navy officers at MIT a course on servomechanisms, particularly as they were used in the automatic steering of ships. During World War II, this work expanded, until he was designing power drives for both navy guns and army weapons. Brown became director of MIT’s Servomechanisms Laboratory, an organization that not only developed new guidance systems, but wrote methods to explain their use and examined problems on the production line. After World War II, Brown became convinced that the MIT electrical engineering curriculum needed serious revision, with more emphasis on processing information and energy and less stress on machinery. Following the example of Dugold Jackson, he encouraged electrical engineering faculty to prepare a new set of courses with new textbooks. He extended these reforms to MIT engineering generally once he became a dean. In addition to V. Bush, H.L. Hazen, and D. Jackson, those mentioned frequently in this interview include E. Bowles, C.S. Draper, J. Forrester, T. Gray, E.A. Guillemin, N. Sage, N. Wiener, and D. White.

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

Computer Oral History Collection, 1969-1973, 1977

Smithsonian
National Museum of American History
Lemelson Center for the Study of Invention and Innovation

Computer Oral History Collection, 1969-1973, 1977

Interviewee:	Walter Bucholtz
Interviewer:	Henry Tropp
Date:	July 30, 1973
Repository:	Archives Center, National Museum of American History
Description:	Transcript, 46 pp.

Abstract: See Byron Phelps interview.

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

Transcript: http://invention.smithsonian.org/downloads/fa_cohc_tr_buch730720.pdf

Smithsonian
National Museum of American History
Lemelson Center for the Study of Invention and Innovation

Computer Oral History Collection, 1969-1973, 1977

Interviewee: Benjamin Burack
Interviewer: Uta C. Merzbach
Date: June 3, 1969
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

Interviewee:	Robert Burns and I. Bernard Cohen
Interviewer:	Elizabeth Luebbert, Robina Mapstone, and Henry Tropp
Date:	August 2, 1972
Repository:	Archives Center, National Museum of American History
Description:	Transcript, 59 pp.

Abstract: After serving in the military during World War II, Robert Burns went to Harvard in 1946 to work on the Mark I computer with Howard Aiken. His colleague, I. Bernard Cohen, who was already at Harvard at that time, took part in the preliminary part of the interview, where he traced the great names in computer history from Pascal and Leibniz to Aiken and von Neumann. The interview is largely a memoir of Aiken and computer development at Harvard, which started under Navy supervision with IBM's cooperation. Burns kept a collection of computer memorabilia over the years that included pictures, log books, and samples of trial runs on the computers developed at Harvard. These are discussed during the interview as they are shown to the interviewers. Particular emphasis is placed on the naval discipline and quality control insisted on by Aiken, although practical jokes and humorous stories also played a large part in the various projects discussed. In addition to Aiken, the names most frequently mentioned are Richard M. Bloch, Grace Murray Hopper, Robert Hawkins, and Anthony G. Oettinger.

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

Smithsonian
National Museum of American History
Lemelson Center for the Study of Invention and Innovation

Computer Oral History Collection, 1969-1973, 1977

Interviewee:	Jim Butler
Interviewer:	Henry Tropp
Date:	June 21, 1972
Repository:	Archives Center, National Museum of American History
Description:	Transcript, 83 pp.

Abstract: See Argonne National Laboratories interview.

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

Computer Oral History Collection, 1969-1973, 1977

Interviewee:	Margaret Butler
Interviewer:	Henry Tropp
Date:	June 21, 1972
Repository:	Archives Center, National Museum of American History
Description:	Transcript, 83 pp.

Abstract: See Argonne National Laboratories interview.

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

Computer Oral History Collection, 1969-1973, 1977

Interviewee:	Howard Campaigne
Interviewer:	Richard R. Mertz
Date:	July 9, 1970
Repository:	Archives Center, National Museum of American History
Description:	Transcript, 42 pp.

Abstract: Howard Campaign was born in Chicago, Illinois, in 1910. He graduated from high school in 1929 and that fall enrolled at Northwestern University to study chemistry. In 1933, he graduated with a degree in mathematics. Campaigne received a teaching fellowship from Northwestern and ultimately his Ph.D. in 1938. Campaigne's Ph.D. work was in the area of hypergroups and was titled "Some Properties of Hypergroups." He then began teaching in the Fall of 1938, at the University of Minnesota in the Department of Math for Science, Literature and Arts. In 1941, Campaigne registered for the draft and was in the Navy doing various types of intelligence operations. Campaigne's introduction to computers was with card-operated tabulating equipment by IBM. He comments on using Friedens and Marchants, desk calculating machines and other card equipment. Some equipment, such as special devices that would do enciphering functions was built. Comments on the building of the 1101, a serial machine with mercury delay line storage also known as "Atlas" in the post World War II era. By 1953, a second design called Atlas II was forming around Williams tubes. Campaigne discusses his devising of a scheme called Octoplex which involved writing information on the drum and linear programming. Notes the use of a machine called "Abner" which was like Standards Eastern Automatic Computer (SEAC). Mentions Hubert Wall, E.J. Moulton, Beveridge, John Coombs, John Howard, Larry Steinhardt, John von Neumann, and George Stibitz.

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

Smithsonian
National Museum of American History
Lemelson Center for the Study of Invention and Innovation

Computer Oral History Collection, 1969-1973, 1977

Transcript: http://invention.smithsonian.org/downloads/fa_cohc_tr_camp700709.pdf

Computer Oral History Collection, 1969-1973, 1977

Interviewee:	Howard Campaigne
Interviewer:	William Luebbert
Date:	May 21, 1974
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

Interviewee:	Robert Campbell
Interviewer:	Henry Tropp
Date:	April 11, 1972
Repository:	Archives Center, National Museum of American History
Description:	Transcript, 99 pp.

Abstract: After receiving a bachelor's degree in physics from the Massachusetts Institute of Technology (MIT), Campbell earned his master's degree at Columbia and did statistical work for the Normal Child Development Study at Columbia Presbyterian Medical Center. He went to Harvard to pursue his graduate education in physics and worked with Howard Aiken who was designing a relay calculating machine with support from IBM. Campbell served as the liaison from Harvard in working with IBM. After designing some demonstration problems for the machine—the Mark I—he programmed the first two problems run when the completed machine was put into operation at Cruft Laboratory at Harvard. He discusses the progression from the Mark I, a decimal electromechanical machine, through the Mark II, a binary-coded decimal relay machine, and the Mark III, a binary-coded electronic machine with a magnetic drum. This progression culminates in the Mark IV, also a magnetic drum machine. In 1947, Campbell went to work for Raytheon where he participated in the development of the Raytheon Digital Automatic Computer (RAYDAC) computer. He left Raytheon in 1949 (before the completion of the machine) and went to Burroughs Corporation. His work there was largely concerned with combining electronic techniques with the existing business machine techniques, one result being the E-l0l, a desk-size electronic computer. He also did extensive work on the Ground Guidance Computer for the Atlas ballistic missile. At the time of the interview, Campbell was with MITRE Corporation. Among the names frequently mentioned are Howard Aiken, Murray Ellis, Howard Shapley, and John von Neumann.

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

Smithsonian
National Museum of American History
Lemelson Center for the Study of Invention and Innovation

Computer Oral History Collection, 1969-1973, 1977

Interviewee:	Richard G. Canning with Ken Garrison
Interviewer:	Robina Mapstone
Date:	August 10, 1973
Repository:	Archives Center, National Museum of American History
Description:	Transcript, 55 pp.

Abstract: Richard G. Canning born in 1918, graduated from the University of Cincinnati in 1940 and spent 1941 through 1945 in the Army Air Corps as a radar officer and radar maintenance officer. He then went to the radio type division of IBM and, when this division was sold, joined a section working on vacuum tubes. This group not only designed new tubes, but selected from tubes produced by RCA those that would be most reliable for the CPD and the IBM 604. In 1950, Canning went to head a group of Electronic Engineering Company engineers at the U.S. Naval Air Missile Test Center at Point Magu. The engineers were hired to operate the RAYDAC. When the machine was delayed, Canning and his colleagues built an analog data reduction system that they called Project Breeze. Canning had been interested in production control since his time at IBM. In 1952, he went to the University of California at Los Angeles as part of an Office of Naval Research sponsored project on the use of computers to simulate shops and improve production scheduling. He describes the decision to establish the Western Data Processing Center at U.C.L.A. and also his own decision to leave academe and start a consulting company with Ralph Sisson. Cannon, Sisson and Associates advised companies on systems analysis and design, helping to set specifications and evaluate bids from manufacturers. Customers included a merchandising corporation interested in transaction recorders and an early user of a computerized system for review of projects known as Systems and Computer Evaluation Review Technique (SCERT). From 1958 to 1962, Canning was an independent consultant, participating in the 1959 Department of Defense conference from which the Common Business-oriented Language (COBOL) emerged. He also wrote two books on commercial uses of computers, founded with Sisson the *Data Processing Digest*, and went on to publish with his wife the journal *EDP Analyzer*. R. Sisson and H. Salveson are mentioned several times in the interview.

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

Computer Oral History Collection, 1969-1973, 1977

Smithsonian
National Museum of American History
Lemelson Center for the Study of Invention and Innovation

Computer Oral History Collection, 1969-1973, 1977

Interviewee:	Edward Cannon
Interviewer:	Richard R. Mertz
Date:	May 11, 1971
Repository:	Archives Center, National Museum of American History
Description:	Transcript, 83 pp.

Abstract: Born in 1907, Edward Cannon attended the University of Delaware where he majored in electrical engineering. Cannon later went to Johns Hopkins University to obtain his Ph.D. in applied mathematics. At Hopkins, Cannon wrote his dissertation on the factorization of Lorentz matrices. During the war years, Cannon enlisted in the naval reserves worked with testing equipment on ships which was designed to protect ships against magnetic mines. After the war, Cannon joined a statistical group at the Bureau of Ships in Washington, DC under John Curtiss. By 1947, there were enough people under John Curtiss that the organization of Applied Mathematics Division became the National Applied Mathematics Laboratory. Cannon was responsible for the computer program, the mathematics component of it. Cannon and his group had to decide how to arrange the design and to consult with experts in the field. Discusses other projects and his colleagues associated with them. Comments on the formation of the UCLA section which became the Institute for Numerical Analysis on the West Coast. The Applied Mathematics Lab in Washington, DC felt that it would be advantageous to have an annex on the West Coast because of the extensive computational activity occurring there and because of the aircraft industry. Cannon, with Curtiss, traveled to the coast to speak with people at Berkeley and Stanford about having a section. A section was established within a university environment because it would attract more people and would have advantages in contract operations. Cannon comments on some of the more significant contributions made by various people—George Forsythe, Smagnus Hestenes, Stiefel, George Dantzig—at the Institute for Numerical Analysis. Cannon notes that Forsythe developed techniques for matrix linear systems and various eigen values. Cannon comments on the differences between the Standards Western Automatic Computer (SWAC) and the Standards Eastern Automatic Computer (SEAC), their development, and his involvement. In approximately 1951, Cannon went to California to help run tests on the SWAC. He discusses this process in great detail. Mentions George Stibitz, John Curtiss, George Dantzig, John von Neumann, Mina Rees, C.B. Tompkins,

Harry Huskey, Ralph Slutz, Franz Alt, Ida Rhodes, and Sam Lubkin.

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

Smithsonian
National Museum of American History
Lemelson Center for the Study of Invention and Innovation

Computer Oral History Collection, 1969-1973, 1977

Interviewee:	James Cass
Interviewer:	Robina Mapatone
Date:	December 18, 1972
Repository:	Archives Center, National Museum of American History
Description:	Transcript, 92 pp.

Abstract: Cass grew up in Eau Claire, Wisconsin, where his mother was a physician and surgeon and his father accountant. Encouraged by his father, he built his own radio set and also took an interest in hi-fi. In 1944, Cass graduated from high school, his parents divorced, and he moved to California with his mother. After a year in Pasadena City College he spent another year studying philosophy at Loyola University in Los Angeles and then entered the California Institute of Technology as a physics major. Working under Jesse Dumond, he built gamma and beta ray detectors and eventually obtained a master's degree in nuclear physics. He also collaborated with Stanley Frankel, designing and building the magnetic drum for the Minimal Automatic Computer (MINAC) and the Continental Automatic Computer (CONAC). When Librascope decided to develop the MINAC into a commercial computer, the LGP-30, Cass left Cal Tech to work on the project. Librascope had originally produced an analog machine to calculate the center of gravity of airplanes with loads variously distributed. When Cass joined the company in 1954, they were completing the CP-209 Airborne Digital Differential Analyzer (DDA). Cass first helped to debug the CP-209, went on to work on the LGP-3O under Raymond Davis and then, when Davis left Librascope in 1955, took over direction of the project. By September of the next year the first working machine was presented to Cal Tech. As a functioning computer that sold for less than $50,000 LGP-3O proved popular, with over 500 machines produced. Cass hoped to build a computer with a core memory that was compatible with the LGP-30, but Royal McBee persuaded Librascope management to develop instead a business data processor, the LGP-9000. Cass was not involved in this project, which proved expensive md led to no product. He did design another machine for business data processing, the RPC-4000, which was a transistorized two address computer with drum memory. He also consulted on other Librascope computer projects, including the Submarine Rocket (SUBROC), a device used in the launch from submarines of rocket-assisted torpedoes, and another machines to assist flight controllers. Those mentioned

frequently by Cass include R. Bible, R. Davis, J. Dumond, S. Frankel, T. Kampe, R. McBee, M. Shiowitz, R. Sprague, and R. Williamson.

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

Smithsonian
National Museum of American History
Lemelson Center for the Study of Invention and Innovation

Computer Oral History Collection, 1969-1973, 1977

Interviewee:	Mary Clem
Interviewer:	Uta C. Merzbach
Date:	June 27, 1969
Repository:	Archives Center, National Museum of American History
Description:	Transcript, 37 pp.

Abstract: Born in Nevad, Iowa in 1905, Mary Clem began working for AIMS in 1925 in the economizing department as a clerk and was trained on the comptrometer. On the comptrometer she computed collations, egressions, did sums, squares, and cross products, and cross accounting records for farmers in the State of Iowa. She put the information onto punched cards and used the Model J and Model K Monroe machines. Mentions A.E. Brant, Professor Sneaker, and Gertrude Blanch.

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

Computer Oral History Collection, 1969-1973, 1977

Interviewee: Richard F. Clippinger
Interviewer: Richard R. Mertz
Date: December 17, 1970
Repository: Archives Center, National Museum of American History
Description: Transcript, 78 pp.

Abstract: Richard F. Clippinger, born in Ohio in 1913, graduated from Kenyon College in 1933, spent two years at the Sorbonne, and continued his mathematical studies at Harvard, obtaining a Ph.D. under the direction of G.D. Birkhoff in 1940. He taught mathematics at the Carnegie Institute of Technology for 3 years and then, in 1944, went to work at the Aberdeen Proving Ground. Clippinger remained at Aberdeen until 1952, when he went to head a computer laboratory at Raytheon. He stayed there when the division was separated to form Datamatic and then sold to Honeywell. At Aberdeen, Clippinger first studied the fluid dynamics of a bullet in flight. Shortly after the Electronic Numerical Integrator and Automatic Computer (ENIAC) was completed, he used it to solve the differential equations for air flowing at supersonic speeds around a body. Clippinger describes the use of function tables on the ENIAC, the trials of keeping the machine in working order once it moved to Aberdeen, and some of the problems studied by users. Drawing on his observations as an army inspector, he also recounts aspects of the history of the the Electronic Discrete Variable Automatic Computer (EDVAC) and the Ordnance Discrete Variable Automatic Computer (ORDVAC). Between 1946 and 1950, Clippinger supplemented his work at Aberdeen by monthly lectures at MIT on fluid dynamics. This work led to the design of a supernonic wind tunnel (Project Meteor). When Clippinger went to Raytheon, the Raytheon Digital Automatic Computer (RAYDAC) was almost complete. His laboratory there used an IBM 650 to study problems of servomechanisms, ray tracing, and geophysics. At Datamatic he was in charge of programming business applications for the Datamatic 1000. Clippinger also had some influence on the design of Honeywell's first transistorized computer, the Honeywell 800. From about 1961 to 1967 he played an active part in national and international attempts to standardize machine codes and programming languages. People Clippinger refers to frequently are John von Neumann and Homer Spence.

Citation: Computer Oral History Collection, Archives Center, National

Museum of American History.

Smithsonian
National Museum of American History
Lemelson Center for the Study of Invention and Innovation

Computer Oral History Collection, 1969-1973, 1977

Interviewee:	Conference on Data Systems Languages (CODASYL) Meeting
Participants:	Charlie Bachman, Dan Vogel, Jack Jones, Dick Kurz, Chuck Greenberger, David Black, Mary Hollis, Greg Dillon, Jim Sweeney, Steve Wright, Bob Bemer, Grace Murray Hopper, Bill Randall, Brian Reynolds, Danny ?, Bill Olle, John Young, Warren Simmons, Bob Grace, Howard Bromberg, Marty Greenville, Stan Epwood, Anaheim Bushed, Tax Metaxides, Bill McGee, John Gosden, Marty Greenfield, Jonas Rabin, George Mann, DDF Goodrich Hubert, Ron Hamm, Jim Manner, Herb Beta, Bill Keating, Peg Harper, Dick Schubert, and Herb Manative
Date:	May 27, 1969
Repository:	Archives Center, National Museum of American History
Description:	Transcript 159 pp.

Abstract:

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

Transcript: http://invention.smithsonian.org/downloads/fa_cohc_tr_coda690527.pdf

Computer Oral History Collection, 1969-1973, 1977

Interviewee:	I. Cohen
Interviewer:	Elizabeth Luebbert, Robina Mapstone, and Henry Tropp
Date:	August 2, 1972
Repository:	Archives Center, National Museum of American History
Description:	Transcript, 59 pp.

Abstract: See Robert Burns interview.

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

Smithsonian
National Museum of American History
Lemelson Center for the Study of Invention and Innovation

Computer Oral History Collection, 1969-1973, 1977

Interviewee:	[Ichel?] Coleman
Interviewer:	Uta C. Merzbach
Date:	June 26, 1969
Repository:	Archives Center, National Museum of American History
Description:	Transcript, 24 pp.

Abstract: Discussion begins with Coleman at Iowa State College in 1934 where he helped Atanasoff build an ionization chamber. Briefly comments on his apprenticing at B.E. Hedges & Company as a tool and die maker and at the Eccles Company as a forging die maker. Describes his involvment with adding machines and parts he made for Atanasoff's machine in the shop at Iowa State College.

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

Computer Oral History Collection, 1969-1973, 1977

Interviewee:	Computer Forum
Interviewer:	Forum
Date:	December 16, 1972
Repository:	Archives Center, National Museum of American History
Description:	No transcript

Abstract: Speaking at forum were Herman Goldstine and Grace Murray Hopper.
Interview not transcribed.

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

Smithsonian
National Museum of American History
Lemelson Center for the Study of Invention and Innovation

Computer Oral History Collection, 1969-1973, 1977

Interviewee:	John Coombs
Interviewer:	Robina Mapstone
Date:	April 16, 1973
Repository:	Archives Center, National Museum of American History
Description:	Transcript, 40 pp.

Abstract: In 1954, Clark Beise, of the Bank of America, recognized the need for automatic check processing. When major computer manufacturers were not interested in buiding machines for this purpose, the Bank of America contacted the Stanford Research Institute (SRI). SRI first developed a device to process traveler's checks. It then made a machine to read and sort ordinary checks and a computer, the Electronic Recording and Machine Accounting (ERMA), to do bookkeeping. The reader/sorter was manufactured by National Cash Register (NCR) and Pitney Bowes and the ERMA by General Electric. Coombs describes manual check processing and the development of machine-readable checks. He began work with the ERMA system in 1957 and discusses the training of programmers for the IBM 702 and then the ERMA, conversion to and use of the ERMA from 1958 onward, retraining of Bank of America bookkeepers, and the eventual replacement of the ERMA system by the IBM 36W65 in the period 1965-1968.

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

Smithsonian
National Museum of American History
Lemelson Center for the Study of Invention and Innovation

Computer Oral History Collection, 1969-1973, 1977

Interviewee:	COT Meeting
Interviewer:	M. Mills (moderator)
Date:	December 1, 1971
Repository:	Archives Center, National Museum of American History
Description:	Transcript, 80 pp.

Abstract: Speakers include: Owen Mock, Erwin Greenwald, Charles Swift, Joel Swartz, Jack Strong, Wes Mellon, Joe Smith, Ellis Meyer, Oliver Smith, Mort Bernstein, Jean Malin, and Roger Mills. Participants discussed the history of the computer on the west coast.

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

Computer Oral History Collection, 1969-1973, 1977

Interviewee:	Lynn Couret
Interviewer:	Robina Mapstone
Date:	June 14, 1973
Repository:	Archives Center, National Museum of American History
Description:	Transcript, 43 pp.

Abstract: Discusses the idea for the Telecomputing Corporation which began in 1947. The company was put together by Bill Bell, Ward Beeman, Jack Weaver, Wishe Colwell, Don Fritz, Jerry Bednarik, and Couret. The company was formed because there was a need for engineering data reduction. Telecomputing did various stress analyses for Lockheed on punched cards. Telecomputing also began developing in 1948 a reader, the Telerecorder, for measuring the pressures of manomener tubes, oscillograph tapes, and other various types of data. The big break for Telecomputing came with the Pioneer Project, a government contract for retrieval systems now known as recovery systems for rockets. COuret comments on the design and development of this retrieval system. Their success with the Pioneer Project brought more government contract work from the Navy, Air Force, and Army. Telecomputing began to grow and so too, did their manufacturing. Comments briefly on wind tunnel experiments and the type of work Telecomputing was undertaking. No commercial data processing was conducted. All of their work involved mathematical equations and radio isotope studies. Discusses the development of the Point-of- Sale, a device attached to a cash register that would record whatever was sold. The idea was to give the merchandising department instant information so they could make immediate decisions. In 1954, Couret left Telecomputing and joined Price Waterhouse's advisory management services. Comments on the downfall of Telecomputing. Among the names frequently mentioned are Ward Beeman, Don Fitz, Jack Weaver, and Wite Colwell.

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

Smithsonian
National Museum of American History
Lemelson Center for the Study of Invention and Innovation

Computer Oral History Collection, 1969-1973, 1977

Interviewee:	Perry O. Crawford
Interviewer:	Richard R. Mertz
Date:	June 26, 1970
Repository:	Archives Center, National Museum of American History
Description:	Transcript, 74 pp.

Abstract: Perry Crawford was born in Medford, Oregon, in 1917. Crawford graduated from the Massachusetts Institute of Technology (MIT) in 1939. At MIT, Crawford became interested in computers from a course he took he the fall of 1938 regarding Vannevar Bush's proposals concerning electronic counters for computing purposes. Crawford wrote his bachelor's thesis on "The Use of Electronic Digital Computing for Matrix Multiplication, Matrix Operations in General." The bulk of the thesis was taken up with matrix methods themselves as a method of problem formulation. Upon graduation, Crawford joined the Center of Analysis, operating the Differential Analyzer as a graduate research assistant and received his master's in 1941. He comments briefly on the design, development, and technical problems associated with the Rockefeller Differential Analyzer. During the war years, Crawford worked on two differential analyzers and a hand calculator for ballistic computation purposes. His chief responsibilities were to run the analyzer and do ballistic calculations. By the middle of 1945, Crawford had taken up an extensive project with the Special Devices Division of the Bureau of Aeronautics as a civil service employee. His principal duties were to work on the Adouble bubble@ project which eventually became the Reeves Electronic Analog Computer (REAC) project and other simulation projects. Crawford discusses the projects Cyclone, Typhoon, Whirlwind, and Hurricane. From 1948 to 1950, Crawford served as the Executive Director of the Ad Hoc Committee on Scientific and Synthetic Analysis. This committee looked into the development of new military and control systems and the use of simulation techniques in the development. In 1950, Crawford left his committee work to join a new company started by Louis de Flores called Intellectron. The mission was to produce a circulation fulfillment system and service for *Newsweek Magazine*. By 1952, Crawford went to IBM where he pursued random access storage. These pursuits with random access led to RANAC, the first major random access system. Ultimately, Crawford settled into working with problem definition, the structuring and specification of data, and solving data problems. Mentions Caldwell, Dick Taylor, Jay

Forrester, and John von Neumann.

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

Computer Oral History Collection, 1969-1973, 1977

Interviewee:	Perry O. Crawford
Interviewer:	Richard R. Mertz
Date:	October 29, 1970
Repository:	Archives Center, National Museum of American History
Description:	Transcript, 48 pp.

Abstract: This interview addresses the naming of project "Whirlwind" at the Massachusetts Institute of Technology (MIT). Whirlwind received its name in 1945, from members of the Special Devices Center, principally Peter Gracio and Ralph Mark. Whirlwind was originally known as Airplane Stability Control Analyzer (ASCA), then later, it was known by its as SDD code letters. Crawford briefly mentions other "windy" names--Cyclone, Typhoon, Zephyr, Hurricane, and Tornado. He discusses the proposed extensions of the application of Whirlwind beyond real time flight simulation and its turn from analog to digital systems. Crawford elaborates upon the Ad Hoc Committee on Scientific and Synthetic Analysis, its participants and mission. Crawford explains the function of other committees and boards—Valley Committee, Advisory Board on Simulation, and Research and Development Board—and their relationship to Crawford's Ad Hoc Committee on Scientific and Synthetic Analysis. He comments upon IBM and their apparent exclusion from groups and activities meeting in the mid 1940s. IBM did not have electronics knowledge at the time and therefore, IBM personnel were not present. However, IBM did have a presence in punch card equipment and certain kinds of computational and comparative reading equipment. Not until the Defense Calculator Proposal during the Korean War did IBM become a major player in the electronics area. Crawford comments on the Bush Differential Analyzer and the Rockefeller Differential Analyzer. Crawford ran a Bush Differential Analyzer and worked to improve it in many ways, especially in bringing the analyzer to the point of running in real time. Cites various writers whom he felt were influential, specifically Korzybski's idea of Non-Aristotelian Systems and Leibniz and Spengler. Discusses his associations and work at IBM in the 1950s. Crawford joined an organization within IBM known as Future Demands under Gordon Brown. This outfit pushed the first business use of computers, the 702 and the 705. Crawford's decision to go with IBM over RCA or UNIVAC was based on their supportive responses to his proposals on random access. Crawford's work was exclusively associated with random access approaches and ultimately what

became telepassing and data-based data communications systems. He reflects on his career and what he felt were the highlights.

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

Smithsonian
National Museum of American History
Lemelson Center for the Study of Invention and Innovation

Computer Oral History Collection, 1969-1973, 1977

Interviewee:	John H. Curtiss
Interviewer:	Henry S. Tropp
Date:	March 9, 1973
Repository:	Archives Center, National Museum of American History
Description:	Transcript, 36 pp.

Abstract: John H. Curtiss was born on December 23, 1909. He graduated from Northwestern University with a MS in statistics in 1930 and a MS and Ph.D. from Harvard University in 1935. Upon graduation from Harvard, Curtiss went to Johns Hopkins University where he was an instructor of mathematics from 1935 to 1936. In 1936, he left Johns Hopkins for Cornell University where he joined the mathematics faculty until 1943. In 1943, Curtiss entered the US Navy and was stationed in Washington, DC with the Bureau of Ships until 1946. Upon his discharge from the Navy, he joined the National Bureau of Standards (NBS). Shortly after joining NBS, Curtiss wrote a memoranda calling for a National Mathematical Computational Center under the Bureau of Standards. NBS also received monies from the Economy Act to develop automatic computing machines. This began an effort by NBS to broaden the statistical effort.

He comments on the Mathematical Tables Project of the Works Progress Administration and discusses Engineering Research Associates (ERA), individuals associated with them and projects. Curtiss comments on various colleagues and other project at other institutions. Mentions W. Edward Deming, Mina Rees, George Stibitz, Ralph Slutz, and Ida Rhodes.

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

Smithsonian
National Museum of American History
Lemelson Center for the Study of Invention and Innovation

Computer Oral History Collection, 1969-1973, 1977

Interviewee:	L.S. Dederick
Interviewer:	
Date:	December 30, 1969
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

Interviewee:	Joseph Desch and Robert Mumma
Interviewer:	Henry Tropp
Date:	January 17, 1973
Repository:	Archives Center, National Museum of American History
Description:	Transcript, 166 pp.

Abstract:

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

Smithsonian
National Museum of American History
Lemelson Center for the Study of Invention and Innovation

Computer Oral History Collection, 1969-1973, 1977

Interviewee: Joseph Desch and Robert Mumma
Interviewer: Henry Tropp
Date: January 18, 1973
Repository: Archives Center, National Museum of American History
Description: Transcript, 121 pp.

Abstract:

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

Smithsonian
National Museum of American History
Lemelson Center for the Study of Invention and Innovation

Computer Oral History Collection, 1969-1973, 1977

Interviewee:	Arthur Dickinson
Interviewer:	Henry Tropp
Date:	March 8, 1973
Repository:	Archives Center, National Museum of American History
Description:	Transcript, 59 pp.

Abstract:

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

Transcript: http://invention.smithsonian.org/downloads/fa_cohc_tr_dick730308.pdf

Computer Oral History Collection, 1969-1973, 1977

Interviewee:	Devies
Interviewer:	
Date:	August 11, 1969
Repository:	Archives Center, National Museum of American History
Description:	No transcript

Abstract: See J.G.L. Michel interview.

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

Smithsonian
National Museum of American History
Lemelson Center for the Study of Invention and Innovation

Computer Oral History Collection, 1969-1973, 1977

Interviewee:	Robert Dietzhold
Interviewer:	Richard R. Mertz
Date:	September 3, 1970
Repository:	Archives Center, National Museum of American History
Description:	Transcript, 71 pp.

Abstract: See Bernard Holbrook interview.

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

Smithsonian
National Museum of American History
Lemelson Center for the Study of Invention and Innovation

Computer Oral History Collection, 1969-1973, 1977

Interviewee:	Bernard Dimsdale
Interviewer:	
Date:	February 23, 1971
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

Interviewee: Stephen H. Dodd
Interviewer: Richard R. Mertz
Date: December 1969
Repository: Archives Center, National Museum of American History
Description: Transcript, 46 pp.

Abstract: Stephen Dodd was born in Lowell, Massachusetts, in 1920, attended high school in West Hartford, Connecticut, and then studied electrical engineering at the Massachusetts Institute of technology (MIT). In the fall of 1942, Dodd began writing his master's thesis under Gordon Brown at the MIT Servomechanisms Laboratory. The thesis concerned a radar servo drive (a hydraulic system). Dodd obtained a joint B.S. and M.S. from MIT in early 1943. He stayed on at the Servomechanisms Laboratory, working under Jay Forrester on a radar antenna and then on an analog computer intended to train pilots and test aircraft designs. The computer needed to be accurate and to operate in real-time, and by about 1947 a digital device seemed more appropriate. The MIT engineers designed and built their own vacuum tubes for the memory of this machine, which came to be called the Whirlwind. The vacuum tube memory was expensive and sometimes difficult to use. Nonetheless, the Whirlwind ushered in a new era for air defense and air traffic control. Dodd mentions numerous people who worked at the Servomechanisms Laboratory, especially Jay Forrester and Bob Everett.

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

Computer Oral History Collection, 1969-1973, 1977

Interviewee: Richard D. Dotts
Interviewer: Robina Mapstone
Date: May 21, 1973
Repository: Archives Center, National Museum of American History
Description: Transcript, 49 pp.

Abstract: Richard Dotts took an early interest in ham radio and taught electronics during World War II. By 1947 he was one of three people in the Planning and Coordinating Department of Pacific Mutual Insurance Company. Dotts and his colleagues sought a computer system that could bring together records concerning insurance policies maintained separately in roughly ten departments of the company. They needed to update records daily and to store information efficiently and reliably over a period of decades. Pacific Mutual acquired a Universal Automatic Computer (UNIVAC) I and later a UNIVAC II. They insisted on tape input and output, and hired people from Remington Rand to maintain their machines. Despite problems with Uni-typers, fears that an earthquake would upset the mercury tank in the acoustical delay line of the UNIVAC, and employees at various levels who distrusted new methods, the system functioned. Dotts also comments on the selection and training of programmers, on computer use at Metropolitan Life Insurance Company and Franklin Life Insurance Company, and on cooperation among UNIVAC users. Ken Garrison is mentioned several times.

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