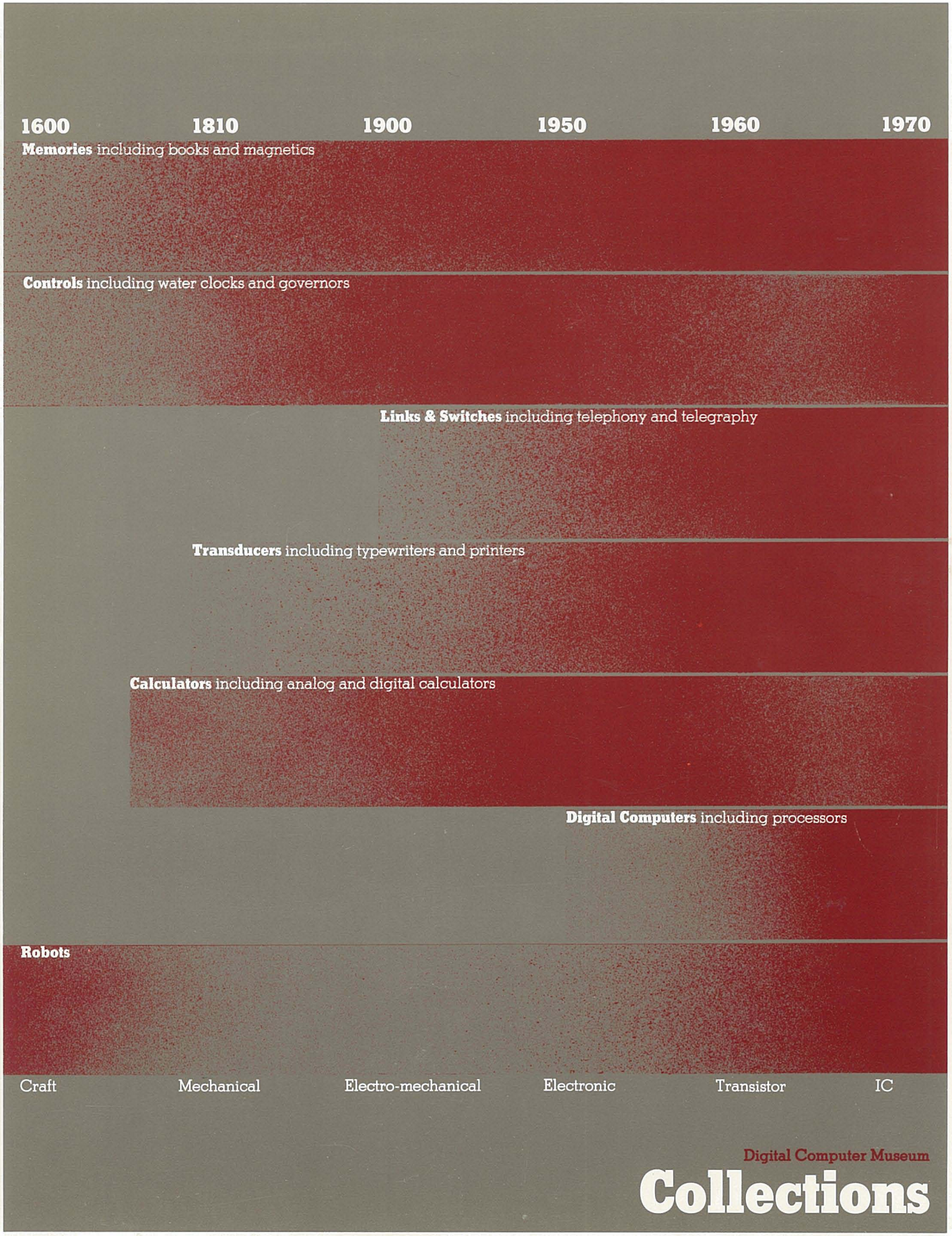
DIGITAL COMPUTER MUSEUM REPORT

1/1982



Digital Computer Museum

Collections

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The Digital Computer Museum is an independent, non-profit, charitable foundation. It is the world's only institution dedicated to the industry-wide preservation of information processing devices and documentation. It interprets computer history through exhibits, publications, videotapes, lectures, educational programs, excursions, and special events.

Hours and Services

The Digital Computer Museum is open to the public Sunday through Friday, 1:00 pm to 6:00 pm. There is no charge for admission. The Digital Computer Museum Lecture Series Lectures focus on benchmarks in computing history and are held six times a year. All lectures are videotaped and archived for scholarly use. Gallery talks by computer historians, staff members and docents are offered every Wednesday at 4:00 and Sunday at 3:00. Guided group tours are available by appointment only. Books, posters, postcards, and other items related to the history of computing are available for sale at the Museum Store. The Museum's lecture hall and reception facilities are available for rent on a prearranged basis. For information call 617-467-4443.

Staff

Gwen Bell
Director
Jamie Parker
Exhibit Coordinator
Christine Rudomin
Program Coordinator
Jay McLeman
Computer Technician
John McKenzie
TX-0 Technician
Beth Parkhurst
Research Assistant
Sue Hunt
Administrative Assistant

Digital Computer Museum One Iron Way Marlboro Massachusetts 01752 (617) 467-4036

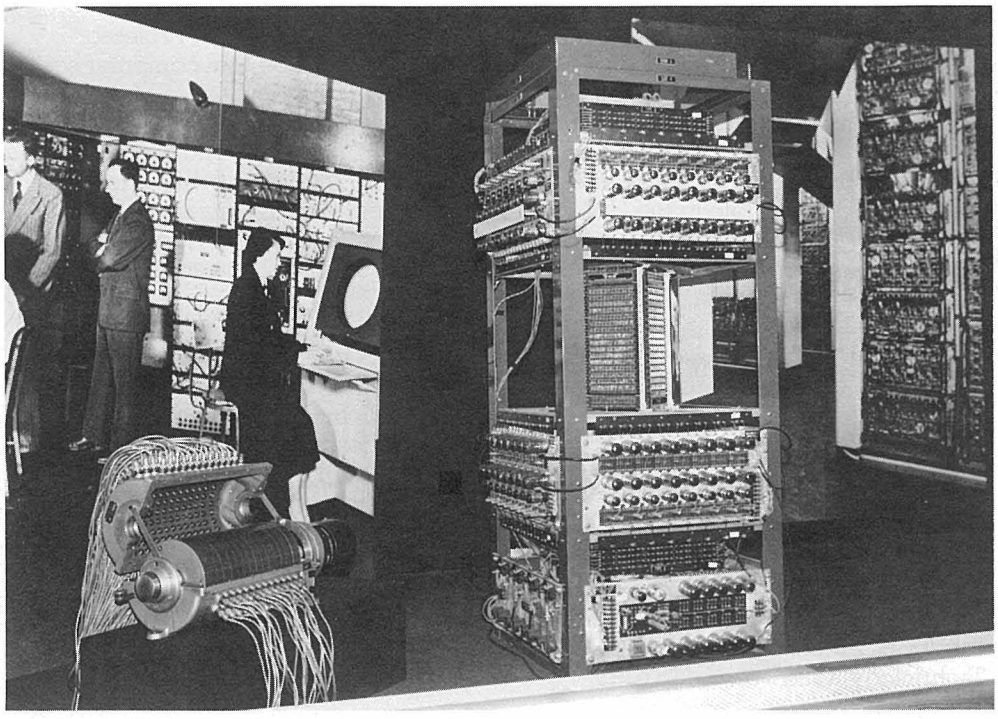
The museum's birth and parentage were responses to different needs that sprang from several sources. When Ken Olsen and Bob Everett saved Whirlwind from the scrap heap in 1973 and arranged to exhibit it at the Smithsonian, they also envisioned a place where all the treasures related to the evolution of computing could be preserved. Then Ken bought the TX-0, the first full-scale transistorized computer, when it came up for auction. Soon word went around that he was maintaining a warehouse for old computers and the industry responded with donations of a LINC, a PDP-8, and other classic machines that otherwise would have been junked.

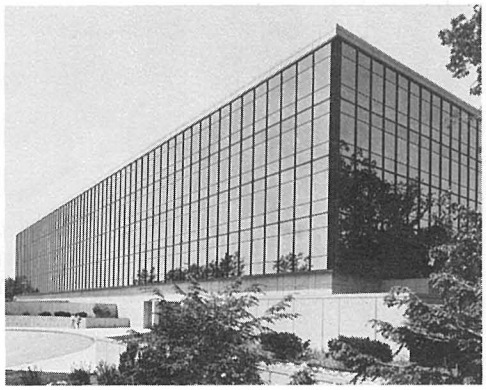
At the same time, Gordon Bell was also thinking about a computer museum, an idea which emerged while writing *Computer Structures* with Allen Newell between 1967 and 1970. They studied all the computers to that date and developed PMS, a notation capable of characterizing all information processing systems. While writing about the machines, Gordon started visiting them and bringing back artifacts. Soon his office and home were filled with modules of the Atlas, the IBM 650, the ILLIAC II, memory devices that predated the core, and calculators that preceded computers.

Still, Gordon was complacent with the thought of a potential museum until he travelled to Japan where Fujitsu proudly turned on its first relay computer for him to admire. He was convinced. If the Japanese could pull this off, then he, Ken Olsen, and Bob Everett should be able to display the TX-0 and other early machines. But there was no budget or space for the Museum.

This time, RCA saved the day. The Marlboro "tower building" constructed by RCA in 1970 and later purchased by Digital had a grand lobby and open balcony waiting to be used for exhibits. Gordon thought that it might somehow provide a setting for the TX-0, and he formed a volunteer committee to evaluate the space.

I was one of the volunteers. Having used the TX-0 in graduate school, I knew how the room felt at MIT, and the balcony area seemed reminiscent of that. The building's residents agreed to accommodate the museum collections. Two college students were hired for the summer to catalogue the artifacts in Gordon's office, photograph the computers that Ken had accumulated in the warehouse, and assemble exhibits with the aid of Digital's industrial designers. Gordon applied the PMS taxonomy from *Computer Structures* and wrote the text panels for the exhibits.





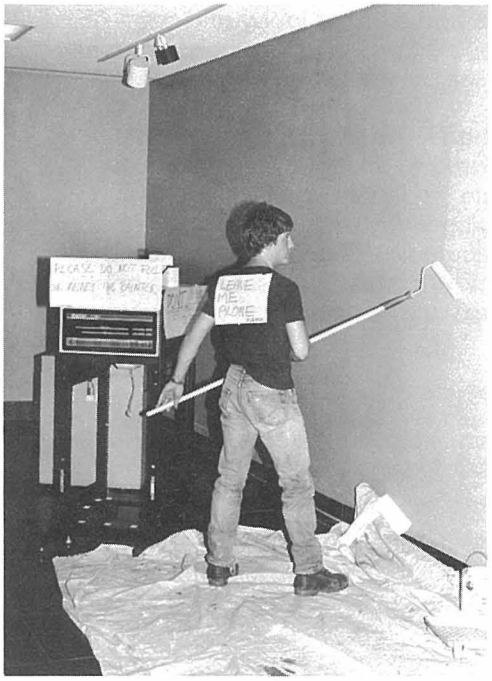
On September 23rd, 1979, the Digital Computer Museum opened with a lecture on the EDSAC by Maurice Wilkes. And while Ken and Gordon were very proud that the collections had been assembled, no one was available to attend to the business of maintaining the collection, providing tours, or accepting new donations.

In November 1979, Jamie Parker, a recent Vassar College graduate, was hired as the first employee and the Museum became operable on a daily basis. A year later, the Operations Committee of Digital Equipment Corporation decided to develop a truly representative, industry-wide museum for the preservation of computing history and I was hired as the Director.

Digital Equipment Corporation not only provided start up funding, but encouraged employees in the legal, financial, marketing, public relations, administration, sales and service, and engineering departments to donate their time and talents to this cause. The birth of the Museum is coincident with the twenty-fifth anniversary of the founding of Digital Equipment Corporation; and the Museum is the corporation's twenty-fifth birthday present to the public as a way to insure the preservation of the history of computing for future generations.

Establishing the Full-Fledged Public Museum

My first task was to transform a private collection into a public foundation with full charitable status. A distinguished board of directors, representative of the diverse nature of the information processing industry, was assembled. The Members Association encourages participation by anyone interested in the Museum's focus and activities. These two groups provide the interface between the Museum's public and its staff, keeping the direction on course and responsive.



The staff has grown and taken on specialized roles. Jamie Parker, exhibit coordinator, planned the Pioneer Computer Timeline, and finds a place for each significant new acquisition. Chris Rudomin, program coordinator, organizes the lectures and seminars, the store, and educational programs. Sue Hunt is the Museum's coordinator of everything else and with a bank of word processors provides our day-to-day support. Jay McLeman, a full time staff member, cares for the operating machines. John McKenzie, who is TX-0's lifetime technician, is working on the long and arduous re-entry of the TX-0 into the world of operating computers.

A phalanx of students tackle special projects. Since the fall of 1980, Professor Mary Hardell of Worcester Polytechnic Institute has arranged that computer science students can complete their Interactive Qualifying Project at the Museum. These range from research papers on benchmark programs, such as Space War on the PDP-1, to preparing explanations of exhibits, such as the Atanasoff-Berry Computer breadboard. Beth Parkhurst has a part time position while she is a fulltime PhD candidate in the History of Technology at Brown University. She wrote the text for the Pioneer Computer Timeline and is editing a videotape of the ENIAC made from old newsreel films. Five additional college students will be hired for this summer.

As Director, I have focussed on acquiring artifacts, conceptualizing projects, and acting as the Museum's spokesperson. On a trip to England in February we acquired the micro-processor from the EDSAC II from the Science Museum, the console of the IBM 360/195 from Rutherford Labs, a full-scale Williams tube, and a logic door from the Ferranti Mark I* from the University of Manchester. Documentation services and a photo and film archive will be realized in the next year. In October I chaired a session on Computers in Museums at the Association of Science and Technology Centers meeting at the Exploratorium in San Francisco and have consulted with other Museums including the Capitol Children's Museum, Washington; The Science Museum, London; the Ampex Museum, Redwood City; and The National Museum of Science and Technology, Ottawa.

Guidelines for the Future

Our main thrust is to develop the collection and continue the tradition of saving classic machines from the junk pile. We rescued the last operational STRETCH, saved the major components of the very first CDC 6600, and collected the Philco-Ford 212 before it was to be scrapped. The first priority is saving history, the second is to display it, and then the third is to interpret its historic role. The exhibits, therefore, are dynamic and evolutionary.

Five tested policies have crystallized.

1. The major purpose of the Museum is the historical preservation of the evolution of computers. To that end, the PMS notation forms the basis of the taxonomy determining the extent of the kingdom of computing and providing guidelines for exhibits. Jan Adkins of the National Geographic Society captured the essense of the venture when he said to me, "You must feel like the Director of the Museum of Natural History when he started to collect bones."

2. The lecture series that started with talks on pioneer computers by people who had personally worked with them will be expanded to a series of seminars in a similar vein. Andy Knowles, a member of the Museum's Board, is fond of reminding me that, "There is no history, only biography." Thus, we are giving the podium to people who can give first-hand biographies of machines, programs, and languages they have known.

3. The focal point of the Museum is the machines themselves. Frank Oppenheimer, the Director and Founder of San Francisco's Exploratorium counsels, "Well-engineered machines speak eloquently of their own elegance. Museum designers can't equal them." Revealing the intrinsic beauty and functionality of the exhibited machines is our challenge and goal.

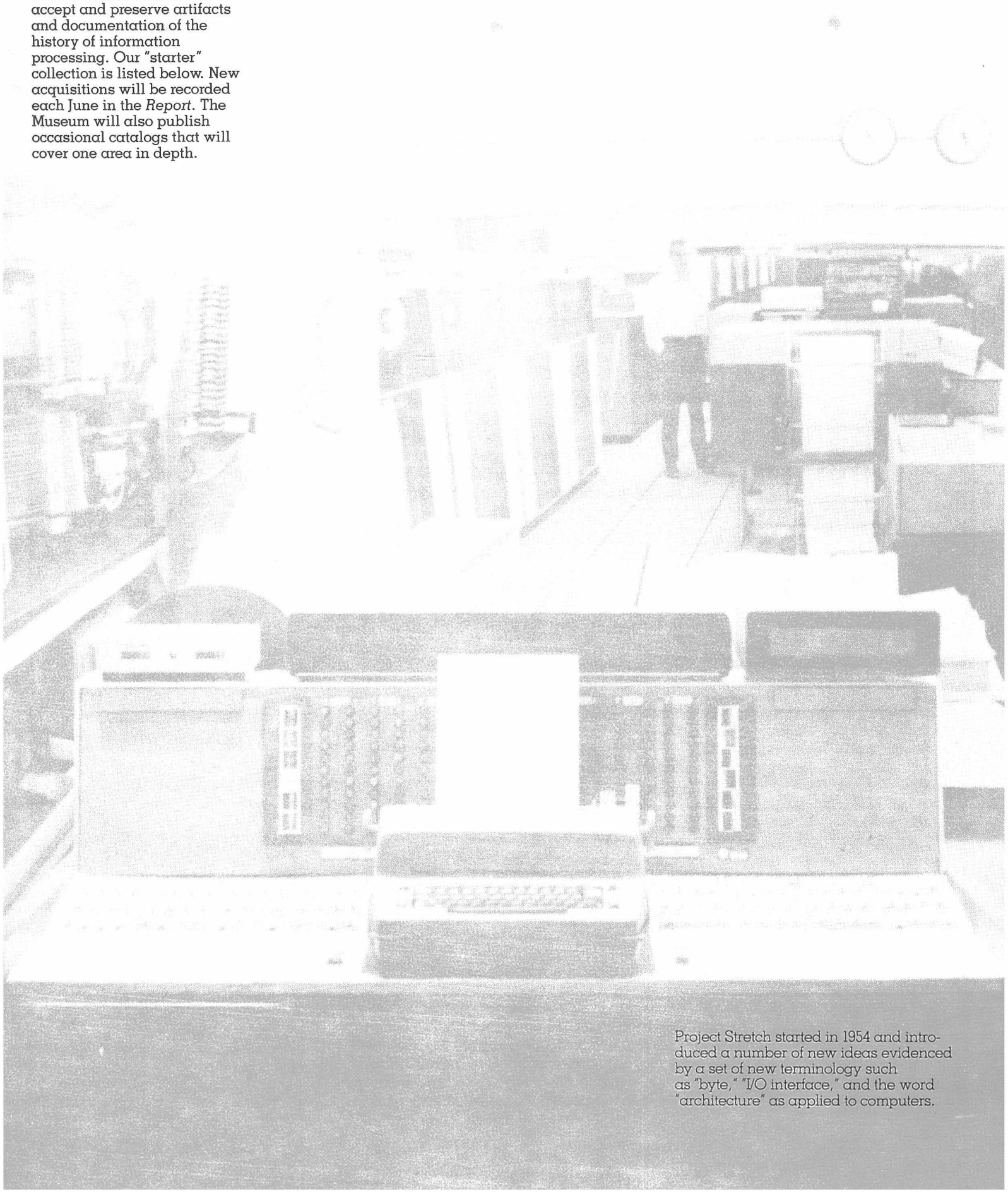
4. The main audience for the historic and archival collections are computer scientists, programmers, history buffs, and those with a curiosity about computer evolution. The Museum will provide a sense of the feel of machines and programs from various eras. Spacewar, the first computer game, feels totally different running on the 1961 PDP-1 than it feels on a small arcade machine. This is hardly apparent to a youngster whose only Spacewar experience is in an arcade, but it is the feel of the PDP-1 that almost brings tears to the eyes of those who were computing during its era. As board member George Michael says, "Hey, this is a Museum for us big kids."

5. The Museum encourages broad-based involvement by maintaining a good working relationship between the enthusiastic volunteers, donors of artifacts, patrons, students, scholars and a staff that can keep stirring the soup. Harold Cohen, creator of our computer-designed murals, observed that the Museum doesn't . . ."have to convince the computer community to support the museum because its artists are worth supporting; they *are* the artists. It is completely different from any other museum that I know."

Because the Digital Computer Museum is unique, its rules need to be invented. This inaugural report provides a baseline from which the Museum can flourish in a multitude of directions. I hope that you will join me in this process.

Gwen Bell
Director

The Museum's charter is to accept and preserve artifacts and documentation of the history of information processing. Our "starter" collection is listed below. New acquisitions will be recorded each June in the *Report*. The Museum will also publish occasional catalogs that will cover one area in depth.



Project Stretch started in 1954 and introduced a number of new ideas evidenced by a set of new terminology such as "byte," "I/O interface," and the word "architecture" as applied to computers.

Bendix G-15 (X48.82)
Gift of the Science Museum of Minnesota

Control Data Corporation, CDC 160A
On loan from Control Data Corporation

Control Data Corporation, CDC 6600 (X38.81)
Gift of Lawrence Livermore National Laboratory

Digital Equipment Corporation, MINC (D155.80)
Gift of Digital Equipment Corporation

Digital Equipment Corporation, PDP-1 (XD116.79)
Gift of Inforonics Corporation

Digital Equipment Corporation, PDP-7 (XD143.80)
Gift of Worcester Polytechnic Institute

Digital Equipment Corporation, PDP-8 (D117.80)
Gift of Digital Equipment Corporation

Digital Equipment Corporation, PDP-11/23 Microcomputer (D33.80)
Gift of Digital Equipment Corporation

Digital Equipment Corporation, PDP-11/45 (D9.81)
Gift of Digital Equipment Corporation

Digital Equipment Corporation, PDP-12 (D156.81)
Gift of Digital Equipment Corporation

International Business Machines Corporation, IBM 7030, "Stretch" (XD250.81)
Gift of Computer Services, Brigham Young University

Librascope General Precision, LGP-30 (X14.81)
Gift of MIT Museum and Historical Collections

Lincoln Laboratories, LINC (D118.79)

Lincoln Laboratories, TX-O (D154.75)
Gift of Digital Equipment Corporation

MITS, Altair 8800 (X58.82)

Massachusetts Institute of Technology, Whirlwind (D29-32.73)
Gift of Digital Equipment Corporation

NASA Apollo Guidance Computer Prototype (X37.81)
Gift of Charles Stark Draper Laboratory. Designed and built at Charles Stark Draper Laboratory, manufactured by Raytheon.

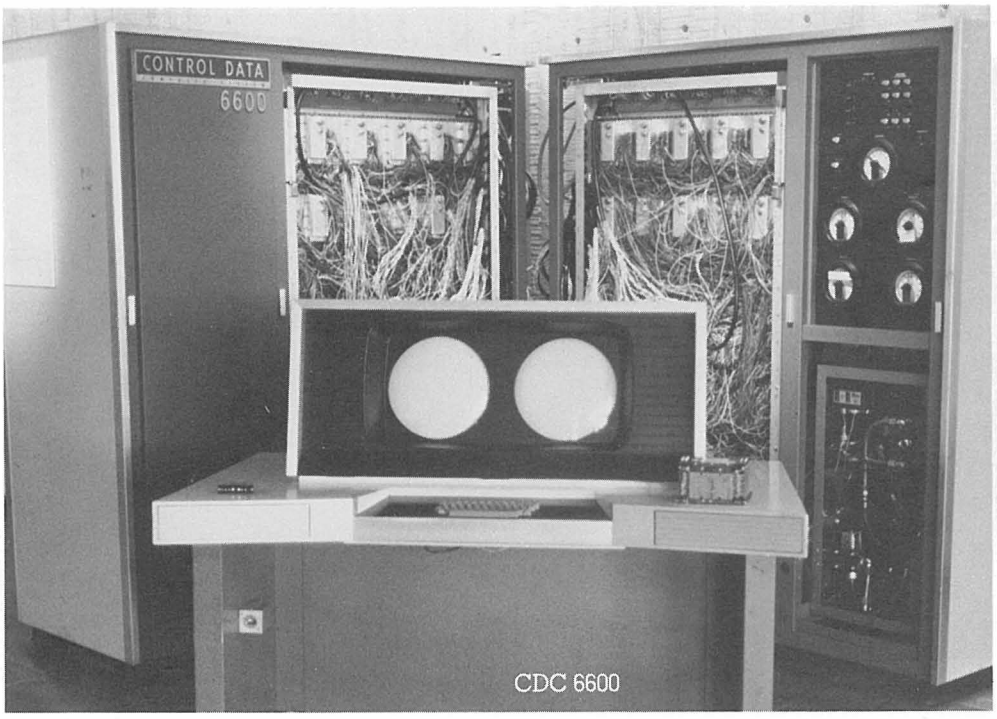
Philco-Ford 212
Gift of Ford Motor Company

Remington Rand, Univac Solid State 80 (X33.81)
Gift of Jodie S. Hobson

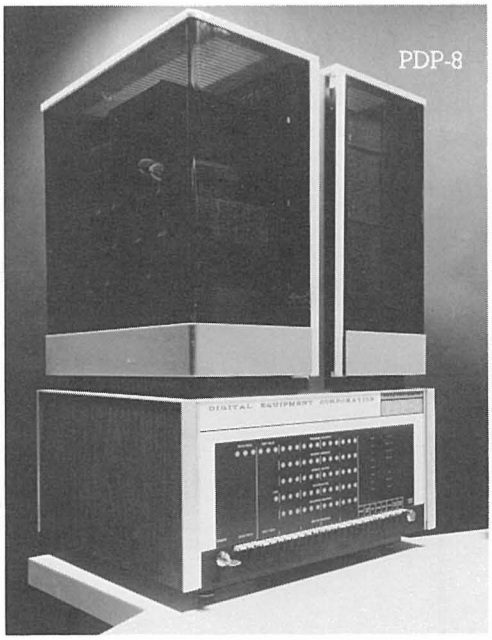
Siemens 2002 (X20.81)
On loan from Siemens Corporation

Texas Instruments, Advanced Scientific Computer (XD224.80)
Gift of Texas Instruments

Lawrence Livermore Laboratories donated the CDC 6600 serial number one. Designed by Seymour Cray between 1960 and 1964, the 6600 made order of magnitude improvements in the speed of computing. Three of the four bays of the central processing unit, the double-tubed video monitor, and high-speed printer are on view.



CDC 6600



In April 1965, the idea of the minicomputer was realized with the delivery of the first PDP-8. The processor of this Classic Eight was housed in a transparent box revealing the elegance of its logic modules.

Amphenol, Vacuum Tubes (X77.80)
Gift of Gary Papazian

Bell Telephone Laboratories, Transistor GA-51984 (X31.81)
Gift of Carver Mead

Bendix G-15 Bit Slice (D202.80)

Berkeley Scientific Corporation, Decimal Counting Unit (D205.80)

Clar Stat Amperite, Ballast Resistor Tubes (Regulators) (X79.80)
Gifts of Gary Papazian

Computer Controls Corporation, Logic Module (D111.80)

Control Data Corporation, STAR Logic Module (XD218.80); 6600 Transfer Board (XD223.80)
Gifts of Lawrence Livermore National Laboratory

Cray Research Inc., Cray I Interface Module (XD226.80)
Gift of Lawrence Livermore National Laboratory

DCS Power Amplifier (X60.82)
Gift of Bob Glorioso

Digital Equipment Corporation, Bit slice triple flip-flop (D201.80); Classroom Module (D206.80); Flip-chip Modules (D213.80); LSI 11 Module (D35.80); PDP-6 System Logic Module; PDP-8/I Logic Module (D220.80); PDP11/20 Module Artwork (D22.79); System Building Block (D203.80); UART Four Channel Asynchronous Serial Interface (D36.80); VAX Prototype UBA (D166.80)
Gifts of Digital Equipment Corporation

Digital Equipment Corporation, PDP-5 Accumulator Boards (X21.81)
Gift of David Razler

English Electric Company, Deuce Arithmetic Logic Element (XD4.75)
Gift of Murray Allen

ENIAC Function Table
On loan from the Smithsonian Institution, National Museum of History and Technology

Fairchild Semiconductor, Semiconductor (X71.82)
Gift of Bob Glorioso

Ferranti Corporation, Atlas 1 Printed Circuit Board (XD1.75); Atlas 1 Digits (XD2.75)
Gift of F. H. Sumner

Ferranti Corporation, Atlas 1 Four Flip-flop Board (X53.81); Mark I* Logic Door (X66.82)
Gifts of Department of Computer Science, University of Manchester

Ferranti Corporation, Atlas 1 Printed Circuit Board (XD128.80)
Gift of Rutherford Laboratory

FUJITSU Ltd., Relay No. 56 (XD71.79), Parametron (XD73.79), Logic Circuit Diagrams (XD77.79), FACOM 100 Relay (XD106.80)
Gifts of FUJITSU, Ltd.

General Dynamics Form Flash Plates from Stromberg Carlson SC4020 (XD131.80)
Gift of Rutherford Laboratory

General Electric, Semiconductor (X70.82)
Gift of Bob Glorioso

Honeywell Sense Amplifier H4200/8200 (XD253.81)
Gift of Phil Goldman

International Business Machines Corporation, 22XX Printer Buffer Array, Logic card from an IBM Printer (XD132.80)
Gift of Rutherford Laboratory

International Business Machines Corporation, IBM 360/91 Console (X73.82)
Gift of Howard Eskin, Columbia University

International Business Machines Corporation, IBM 650 Logic Module (XD12.75)
Gift of Murray Allen

International Business Machines Corporation, SMS Logic Module (D113.80)

Manchester University, Mark I Valve (XD5.75)
Gift of Department of Computer Science, Manchester University

MITS, Altair 8800 CPU Board (X6.80)
Gift of Ed Luwish

Motorola, Semiconductor (X68.82)
Gift of Bob Glorioso

National Union, Vacuum Tubes (X76.80)
Gifts of Gary Papazian

Philco, Transistors (X64.82)
Gifts of Bob Glorioso

Raytheon, Electron Tubes (X74.82)
Gifts of Gary Papazian

Raytheon, Power Transistor 2N1662 (X59.82)
Gift of Bob Glorioso

RCA, Radio and Electron Tubes (X75.80)
Gifts of Gary Papazian

RCA, Transistors (X72.82)
Gifts of Bob Glorioso

SDS-SD Sales, S-100 CPU Board (XD236.81)
Gift of David Ramsperger

Sylvania, MOBIDIC Logic Board (XD192.80)
Gift of Frank Feigin

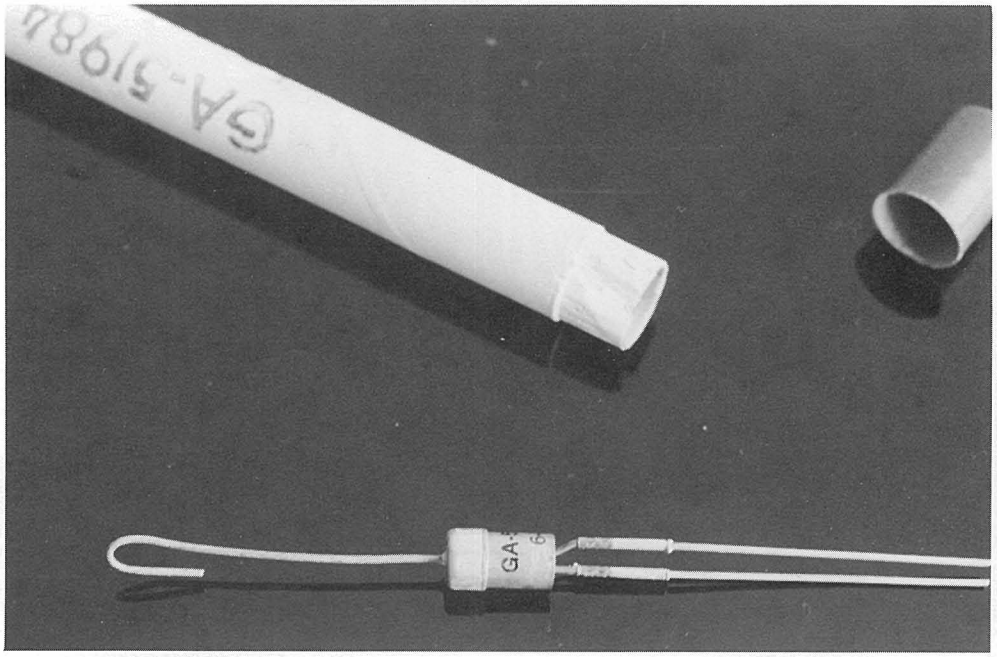
Texas Instruments, Semiconductors (X61.82)
Gifts of Bob Glorioso

Transitron, Diodes (X63.82); Semiconductor (X69.82)
Gifts of Bob Glorioso

University of Illinois, ILLIAC II BLOCK Multiplexor called "Interplay" (XD216.75); ILLIAC III Printed Circuit Module
Gifts of Clifford Carter

Westinghouse, RTL Integrated Circuits (X62.82)
Gifts of Bob Glorioso

This 1953 transistor had its own serial number and was individually packaged. The tube was indented to hook the transistor over the side and keep its "whiskers" from becoming bent.



Bunnell, Telegraph Sender and Receiver (XD229.80)
Gift of Rodney Bamford

Harold Cohen, "Turtle" (X50.82)
On loan from Harold Cohen

Columbia Graphophone Company, Dictaphone, Shaver, Transcriber (D123.79)

Digital Equipment Corporation, Type 30A CRT (X25.81)
Gift of Harvey Wiggins

Digital Equipment Corporation, 338 Display Unit (X23.81)
Gift of Ford Motor Company

Digital Equipment Corporation, GIGI (D276.82); GT-40 (D10.81); VT 105 (X36.81)
Gifts of Digital Equipment Corporation

Digital Equipment Corporation, VT 105 (X36.81)
Gift of American Computer Group Inc.

Allen B. Du Mont Laboratories, Inc., Cathode-Ray Oscillographs (X26-8.81)
Gifts of Ken Olsen

Edison Company, Ediphone, Utility Shaver and Voice Recorder (D121.80)

"Enigma" (B197-8.81)
On loan from Gordon and Gwen Bell

Friden Corporation, Friden Paper Tape Reader (X9.80)
Gift of Ed Luwish

International Business Machines Corporation, IBM Card Punch (X40.80)

International Business Machines Corporation, IBM Auto-typist Perforator and Printer (X16-7.81)
Gifts of Solomon Schecter Day School

International Telephone and Telegraph, Teletype (D117.80)
Gift of Jack Brown

C. Lorenz A-G, Telegraph Transmitter (X30.81)
Gift of Alexander Vanderburgh Jr.

Martin Marietta Corporation, Clary Printer adapted for computer output (XD208.80)
Gift of Clyde Still

The Noiseless Typewriter Company, "Noiseless Typewriter" (X5.80)
Gift of Ed Luwish

The Noiseless Typewriter Company, "Noiseless Typewriter" (X18.81)
Gift of Trudy Leonard

Railroad Telegraph Transmitter (XD182.80)
Gift of Cliff Granger

Remington Rand, UNIVAC Card Punch (X34.81)
Gift of National Museum of Science and Technology, Ottawa

Telegraphen-Bau-Anstalt von Siemens and Halske, Needle Telegraph (X19.81)
On loan from Siemens Corporation

Signal Electric Manufacturing Company, "Signal Telegraph Instrument" (B164.81)
Gift of Gordon and Gwen Bell

Teletype Corporation, Model 19 Teletypewriter (XD159.80)
Gift of Dick Eckhouse

Triadex Inc., "The Muse" (XD254.81)
Gift of Ed Fredkin

Western Electric, Telephone (X32.81)
Gift of Daniel Rizzo

Western Electric, Telephone (X56.80)
Gift of James Parker

"ZZZ German Order of Battle according Commander-in-Chief on 27th (A.) 14 Army, Coast, Right Wing of Bridgehead now only guarded . . . ." A top-secret message from Field Marshal Kesselring, supreme commander of the German forces in Italy, to Berlin. Originally encoded on the "Enigma" (similar to the one shown), the message was deciphered by code-breakers at Bletchley Park within hours of transmission. The critical importance of code-breaking led the British to fund computational development during World War II.

Abacus (B93.80)
Gift of Gordon and Gwen Bell

ADDI-COSMOS, "B.U.G. Calculator" (B131.80)
On loan from Gordon and Gwen Bell

Aeroproducts Research, Inc., Flight Plan Calculator (X55.82)
On loan from Steve Kallis

R. C. Allen, "ARITHMA" (XD125.80)
Gift of Arthur Hall III

American Can Company, "American Adding Machine" (B180.81)
Gift of Gordon and Gwen Bell

Anita, Electronic Calculator (XD209.80)
Gift of Leonard Woodall

Atanasoff-Berry Computer Breadboard (X12.80)
On loan from John Vincent Atanasoff

Automatic Adding Machine Company, "Golden Gem Adding Machine" (X2.81)
Gift of Erwin Tomash

Bell Telephone Laboratories Calculator, prototype adder reproduced by George Stibitz (XD127.80)
Gift of George Stibitz

Bohn Contex, Desk Calculator (X43.81)
Gift of Bob Olthoff

Brical Pocket Adding Machine (X13.80)
On loan from Dick Rubinstein

"Circular Concise Slide Rule" (B114.80)
Gift of Gordon and Gwen Bell

Clary Corporation, Clary DE600 (X35.81)
Gift of Lee McKusick

Colossus Narrow Tape Pulley (X49.81)
Gift of Toby Harper

Contina Ag Mauren, "Curta" (B87.79)
Gift of Brian Randell

Drawing Instruments ca 1850 (B106.80)
On loan from Gordon and Gwen Bell

Dring and Fage, Inland Revenue Slide Rule (B55.80)
On loan from Gordon and Gwen Bell

Dring and Fage, "Leadbetter Slide Rule" (B108.80)
Gift of Gordon and Gwen Bell

Hans W. Egli, "Millionaire" (B1.75); (B136.81)
On loan from Gordon and Gwen Bell

Hans W. Egli, "Millionaire" (B91.76)
Gift of Gordon and Gwen Bell

"EXACTUS" (B36.79)
Gift of Gordon and Gwen Bell

Fowler and Company, "Fowler's Textile Calculator" (B112.80)
On loan from Gordon and Gwen Bell

J. F. Fuller, "Palmer's Improved by Fuller Computing Scale" (B110.80)
Gift of Gordon and Gwen Bell

J. F. Fuller, "Palmer's Improved by Fuller Computing Scale" (X1.81)
Gift of Erwin Tomash

General Precision Systems, General Purpose Analog Computer (X42.79)
Gift of Lincoln-Sudbury Regional High School

Gunter Rule (B41.79)
Gift of Gordon and Gwen Bell

Gunter Rule (B4.76)
On loan from Gordon and Gwen Bell

Hewlett Packard, "HP-35" (B34.79)
Gift of Gordon and Gwen Bell

The Hollerith Electric Tabulating System, Reproduction by Roberto Guatelli (D231.81)
Gift of Digital Equipment Corporation

Jacquard Loom Mechanism (B117.80)
On loan from Gordon and Gwen Bell

Keuffel & Esser, Slide Rule (XD50.76)
Gift of Dick Clayton

Keuffel & Esser, "Thacher's Calculating Instrument" (B56.80)
On loan from Gordon and Gwen Bell

C & E Layton, "Tates Arithmometer" (B82.80)
On loan from Gordon and Gwen Bell

Lewis & Tylor, Ltd., "Hydralculator" (B113.80)
Gift of Gordon and Gwen Bell

L. I. D., Timber Calculating Slide Rule (B30.77)
On loan from Gordon and Gwen Bell

Lightning Portable Adding Machine from the desk of George Forsythe (X15.81)
Gift of Gio C. M. Wiederhold

Marchant Electric Calculator (XD235.81)
Gift of Robert Floyd

Navigator's Gunter Rule (B54.80)
On loan from Gordon and Gwen Bell

Navigator's Sector (B21.78)
On loan from Gordon and Gwen Bell

Aaron Palmer, "Palmer's Pocket Scale" (B194.81)
On loan from Gordon and Gwen Bell

Pascal Adder, Reproduction by Roberto Guatelli (B150.81)
On loan from Gordon and Gwen Bell

Frederick Post Company, "Versalog Slide Rule" (X47.81)
Gift of Cliff Hafen Jr.

Powers Samas Card Processing System (XD14.81)
Gift of the Biological Research Centre, Institute of Terrestrial Ecology

Precision Adding Machine Company, Inc. "Quixsum Adding Machine Model C" (B38.79)
On loan from Gordon and Gwen Bell

Raytheon, Hawk Missile Auto Pilot (XD144.80)
Gift of Joe Kuprevich

Reliable Typewriter & Adding Machine Corporation, "Addometer" (B85.79)
Gift of Gordon and Gwen Bell

J. Sang, "Platometer" (B6.76)
On loan from Gordon and Gwen Bell

Selective Educational Equipment Corporation, "SEE CALCULATOR" (B31.79)

Servo Calculator Company, "Direct Reading Frequence Response Slide Rule" (X3.81)
Gift of Jack Worlton

Stanley Rule & Level Company, Timber Slide Rule (B99.80)
Gift of Gordon and Gwen Bell

M. Thomas de Colmar, "Arithmometer" (B3.76)
Gift of Gordon and Gwen Bell

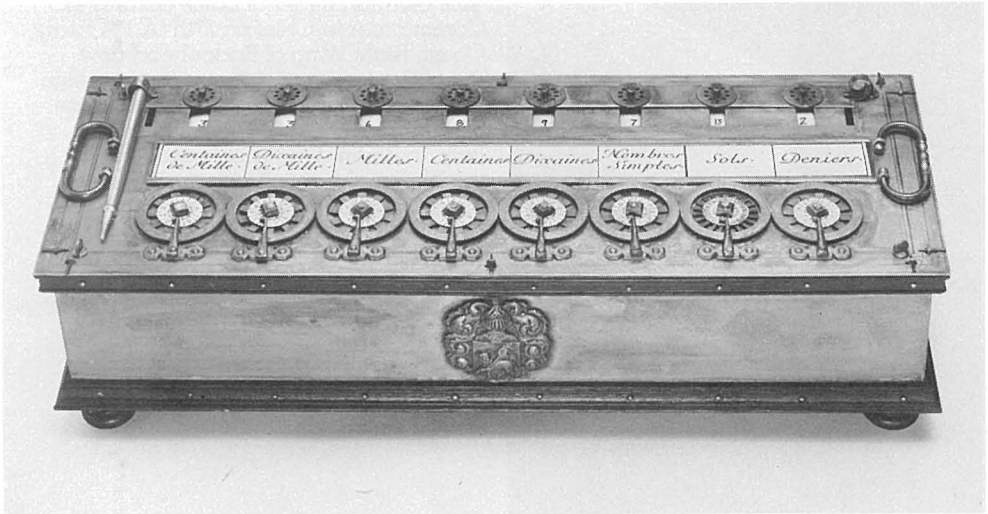
M. Thomas de Colmar, "Instruction pour se servir de L'Arithmometre Machine a Calculer" (X4.81)
Gift of Erwin Tomash

J. Thomlinson, Ltd., "Thomlinson's Equivalent Paper Slide Rule" (B107.80)
Gift of Gordon and Gwen Bell

Texas Instruments, Slide Rule Calculator (XD237.81)
Gift of Mike Riggle

Tinker Toy Computer (X39.81)
Gift of Danny Hillis, Brian Silverman and friends

Wolverine Supply and Manufacturing Company, "Adding Machine" (B167.81)
Gift of Gordon and Gwen Bell



The Pascaline (1645) is the first mechanical, single register calculator built that is still in existence. Roberto Guatelli reproduced this copy from an original in the collection of Thomas Watson stored by IBM. The calculator was designed by Blaise Pascal, the famous French scientist and philosopher, at the age of 19. Although a number were built during his lifetime, the tooling was such that they were unreliable, and became curiosities as much as calculators. The principles of Pascal machines were later applied to key punch calculators such as the Comptometer.

Atanasoff-Berry Computer Memory Drum (X11.80)
On loan from Dr. Clair Maple

Autonetics, Minuteman Fixed Head Disk Memory (XD107.80)
Gift of Aron Insinga

Bryant Computer Products, RM-10 Drum (X51.82)
Gift of Nigel Webb

Bubble Memory System (D8.81)
Gift of Nick Warchol

Richard Stevens Burrington, "Handbook of Mathematical Tables and Formulas" (B44.79)
Gift of William B. Lehmann

CCD Memory Board (D7.81)
Gift of Nick Warchol

Chemical Rubber Publishing Company, "Handbook of Chemistry and Physics, 31st Edition" (B28.79)
Gift of Gordon and Gwen Bell

Computer Controls Corporation, Delay Line Memory/Logic Module (D108.80)

Control Data Corporation, CDC 38500 Cartridge (XD222.80)
Gift of Lawrence Livermore National Laboratory

Digital Equipment Corporation, Core Memory (D200.80); 18 mil Planar Memory (D198.80); Experimental Ferrite Memory Stack (D160.80); PDP-11 Planar Structured Core Memory (D241.80); 64K Byte Memory Module (D34.80); VAX SBI Memory Board (D164.80); VAX Star 64K MOS Memory Array (D165.80)
Gifts of Digital Equipment Corporation

Disk Drive Prototypes (X52.82)
Gift of Steve Lambert

The Emeloid Company, Inc., "Transmission Line Calculator" (X29.81)
Gift of Cliff Hafen Jr.

English Electric Company, Deuce Mercury Delay-line (XD3.75); Deuce Memory Drum (X65.82)
Gifts of Murray Allen, University of Sydney

Ferranti Ltd., Atlas 1 Fixed Memory (XD129.80); Atlas 1 Memory "The Supervisor" (XD130.80)
Gift of Rutherford Laboratories

Ferranti Ltd., Magneto-strictive Delay-line (XD230.80)

Ferranti Ltd., Pegasus Short Acoustic Delay-line (X54.82); Williams Tube (X67.82)
Gifts of Computer Science Department, Manchester University

Ferroxcube Corporation of America, Ferroxcube Core Memory (D195.80)

FUJITSU Ltd., Hollerith Read Only Card Reader and Cards (XD74-5.79); Paper Tape for FACOM (XD76.79)
Gifts of FUJITSU Ltd.

Harvard University, Mark IV 64-bit Magnetic Shift Register (XD6.75)
Gift of Bob Trocchi

Hertrich Development Inc., RL01 Disk Drive Prototype (XD163.80)
Gift of Fred Hertrich

Honeywell Memory Sense Amplifier (X22.81)
Gift of Phil Goldman

Honeywell Plated Wire Memory (D114.80)

Charles Hutton, "Table of the Products and Numbers" (B2.76)
On loan from Gordon and Gwen Bell

International Business Machines Corporation, 2321 Data Cell Drive (X46.82); 2321 Data Strips (XD219.80); Data Cell (XD220.80); 1360 Photo-digital Storage System (XD221.80)
Gifts of Lawrence Livermore National Laboratory

Los Alamos Scientific Laboratory, MANIAC Electrostatic Memory and Williams Tube (XD214.80)
Gift of Los Alamos Scientific Laboratory

Mermod Freres, Piano Disk (XD136.80)
Gift of Marv Horovitz

MITS, Altair 4K RAM Board (X7.80)
Gift of Ed Luwish

"Model Ready Reckoner" (X57.80)
Gift of McLaren Harris

Napier's Bones (B27.79)
On loan from Gordon and Gwen Bell

NASA Apollo Guidance Computer Read Only Rope Memory (XD115.76)
Gift of Albert Hopkins

Phillips, Ferroxcube FFI (D204.80)

RCA, Core Memory Board (XD197.80)
Gift of Gary Papazian

RCA, Experimental Ferrite Core Memory (D161.80); Thin Film Memory (D112.80); Non-destructive Read-out (D162.80)

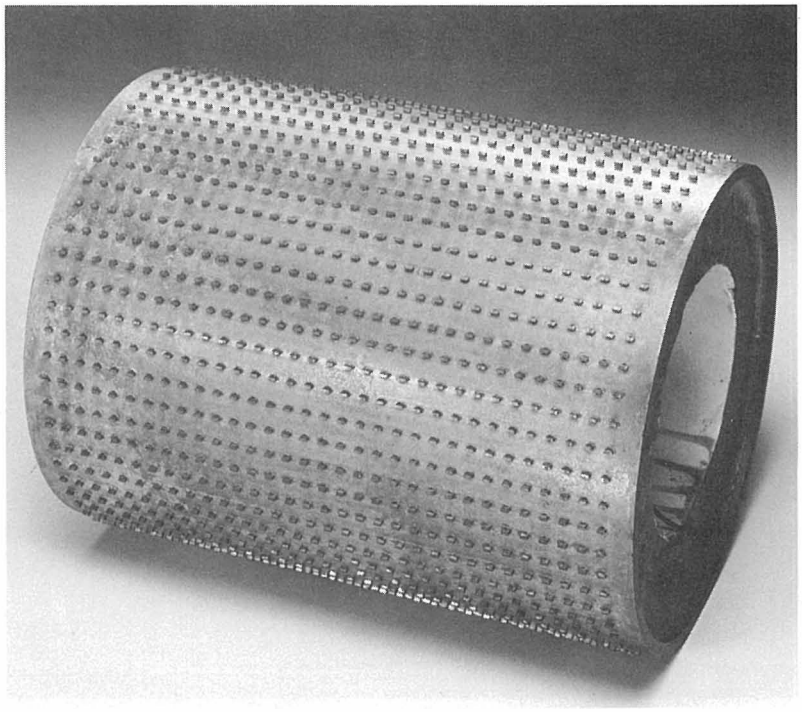
RCA, Ferrite Core Memory Cube (D169.80)
Gift of Cliff Granger

RCA, JOHNNIAC Selectron Tube (XD215.80)
Gift of John Postley

"Sumador Chino" (X10.80)
Gift of Jim Rogers

3 M Corporation, Telex Disk (D80.80)
Gift of Don Sordillo

University of Illinois, ILLIAC II 48-bit Register, Mesa Transistor (XD120.80)
Gift of Los Alamos Scientific Laboratory



This drum is the only remaining portion of the Atanasoff-Berry Computer, the first electronic, digital calculator. Two drums were built, each with 32 50-bit tracks of small paper condensers, with the outer end connected to a contact stud and the inner ends connected together and brought out through the mounting plates. The space near the periphery, in which the condensers are mounted, contains a high grade of wax for moisture protection. A positive charge on the outer end of a condenser corresponds to zero, a negative charge to one. The drum rotates on an axis at a speed of one revolution per second. Brushes bear upon their contacts to read the charges and recharge them.

Michael Adams
John Vincent Atanasoff
Gordon Bell
Charles and Constance Bachman
Bell Laboratories
Brigham Young University, Computer Services
British Telecom Research Laboratories
Arthur W. Burks
Wesley Clark
Harold and Becky Cohen
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George Stibitz
Ivan Sutherland
John A. Swets
Texas Instruments
University of Manchester, Department of Computer Science
Gordon Welschman
James Wilkinson
Konrad Zuse

Maurice Wilkes spoke at the inauguration of the first exhibits, September 23rd, 1979. The eleven other lectures given to date include nine by people closely associated with the machines featured on the Pioneer Computer Timeline, one on the Computer Murals and one on the LINC. These lectures were recorded on video-tape for the Museum's archives. Six major lectures relating to the exhibitions at the Museum are planned each year.

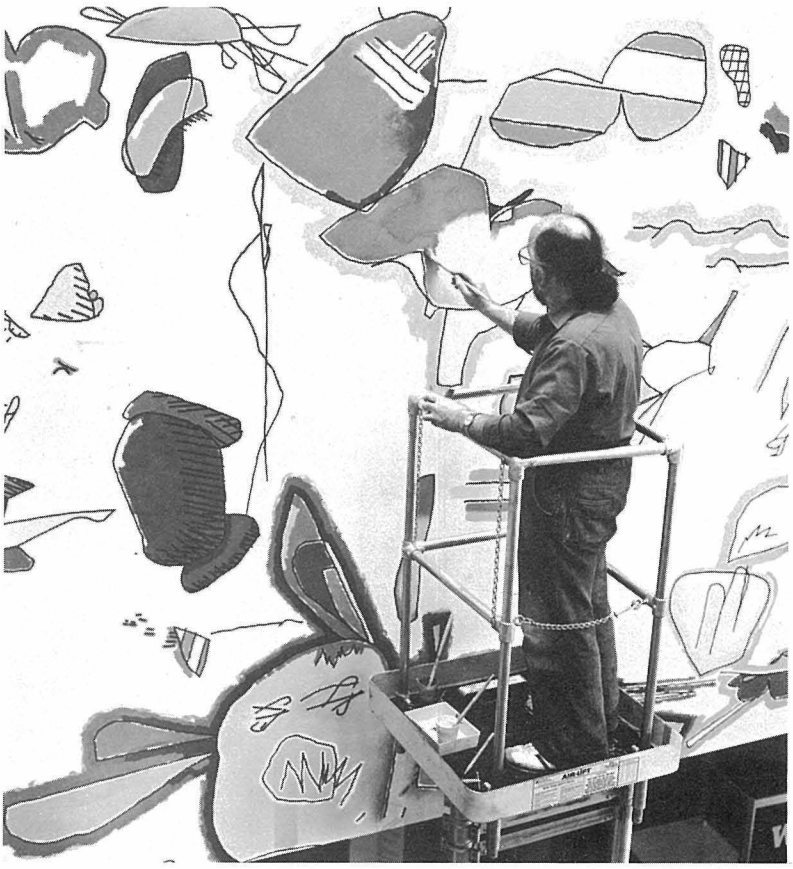
Harold Cohen, September 23, 1980
The Program and Art behind the Museum's Murals

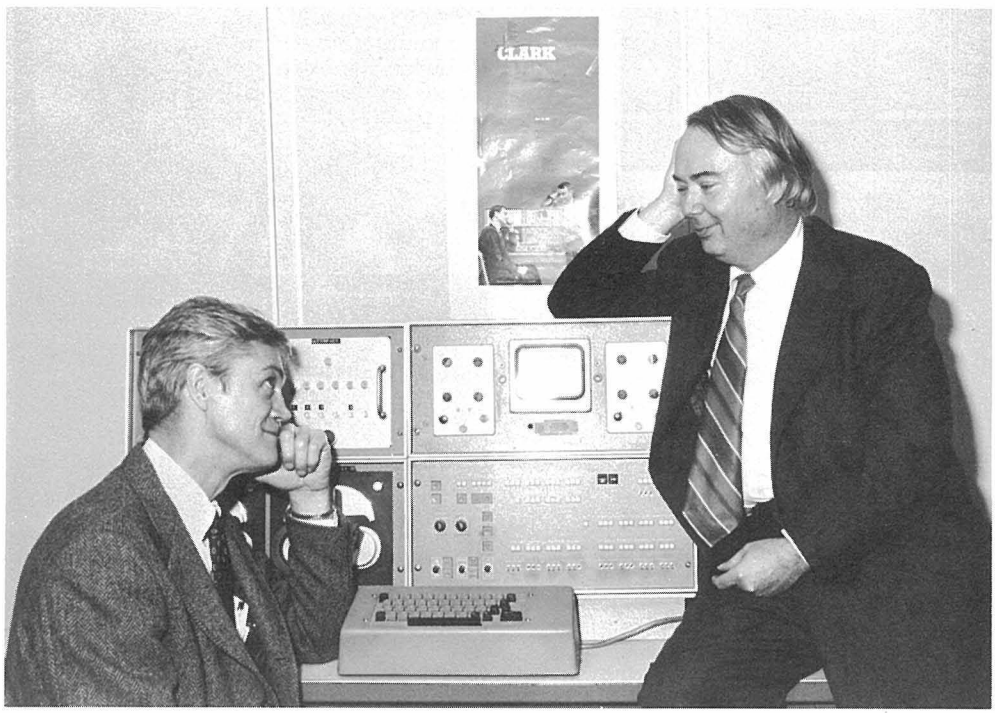
"Deep down inside I told myself my real preoccupation has been not games having to do with how you generate patterns but with games of meaning. How do you come to terms with the curious issue of imagery in artmaking?"

"The people at Stanford couldn't understand at all why I was using up all this computer time making all these funny squiggles."

Harold Cohen painting "Primavera in the spring," September 1980.

Photo by Becky Cohen.





Wesley Clark, November 18, 1981
The Design, Building, and Use of the First Laboratory Computer: LINC

"The concept of putting this in one box that an experimenter could take away to his laboratory and work with in a personal way was the essence of it."

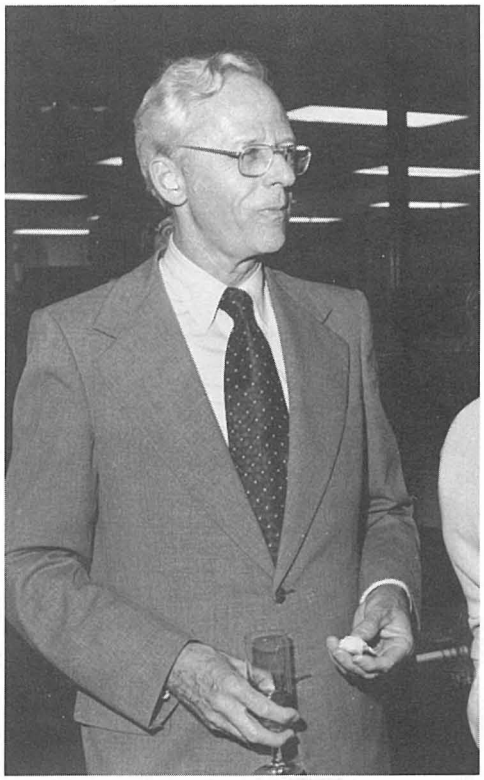
"One fellow looked at the LINC inside and out, and at this wire going over and to the other side. Then said, 'This thing can't possibly work, there is no way to get the data in.' He couldn't find any punched cards. We went back to Lincoln Laboratory exhausted but triumphant, wanting to do more."

Wesley Clark and Charles Molnar recreating a classic pose with the LINC at the Museum.

Maurice Wilkes, September 23, 1979
The Design and Use of the EDSAC

"We realized that building the machine was only the start of the project; that there was a great deal to be learnt about writing programs, about how to use the machine for numerical analysis, numerical calculation, and all the rest of it"

"As soon as we started programming, we found to our surprise that it wasn't as easy to get programs right as we had thought. Debugging had to be discovered. I can remember the exact instant when I realized that a large part of my life from then on was going to be spent in finding mistakes in my own programs."



Jay Forrester, June 2, 1980
The Design Environment and Innovations of Project Whirlwind

"The Whirlwind experience was a very good beginning because we learned the problems of pioneering, we learned the need for courage to stand up for what you believe."

"Magnetic core storage, marginal checking, high reliability, cathode-ray displays, light gun, and a kind of time-sharing were all part of Whirlwind."

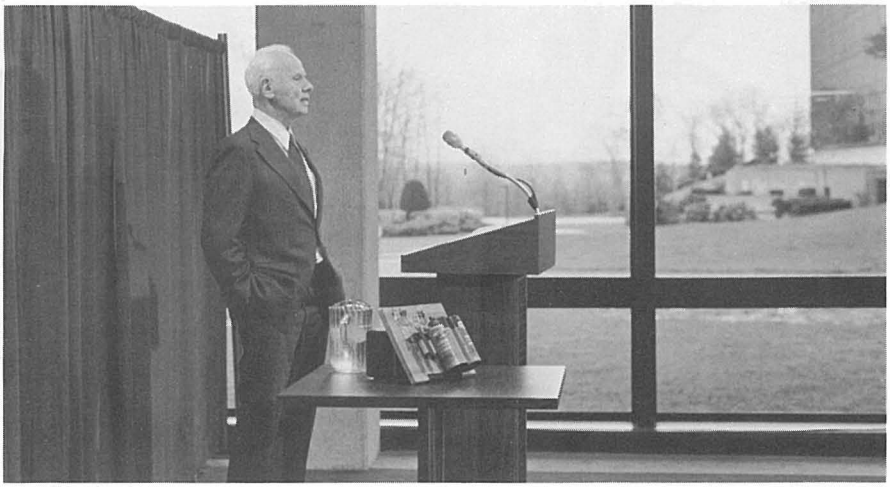
Jay Forrester

John Vincent Atanasoff, November 11, 1980
The Forces that Led to the Design of the Atanasoff-Berry Electronic Calculator

"I soon found that no machine or system available could solve the growing lists of problems of theoretical physics, technologies, statistics, or business."

"There I was in 1936, turning my mind to invent a digital machine, not knowing how it would be built or how it would work. . . . In a larger sense no man invents anything; he builds and extends a little with his friends and on the shoulders of others."

John Vincent Atanasoff



George Stibitz, May 8, 1980
The Development, Design and Use of the Bell Laboratories Relay Calculators

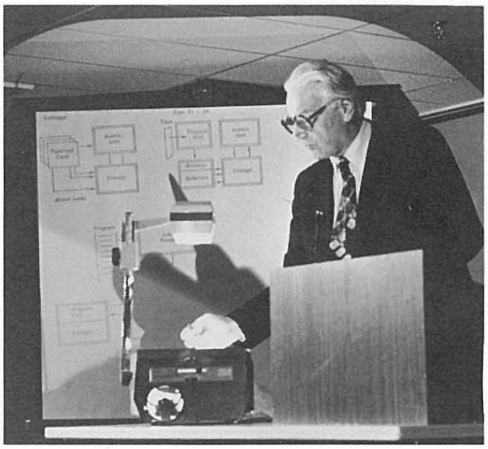
"In 1939, it was funny to think of a machine that calculated in the ancient binary notation. I wasn't sure whether the idea was funny or not, and for several weeks I thought it over, drawing circuits at home for a real calculator with desk-top capabilities."

George Stibitz presenting his talk.

Konrad Zuse, March 4, 1981
Designing and Developing Z1 – Z4

"At that time, nobody knew the difference between hardware and software. We concentrated ourselves on purely technological matters, both logical design and programming."

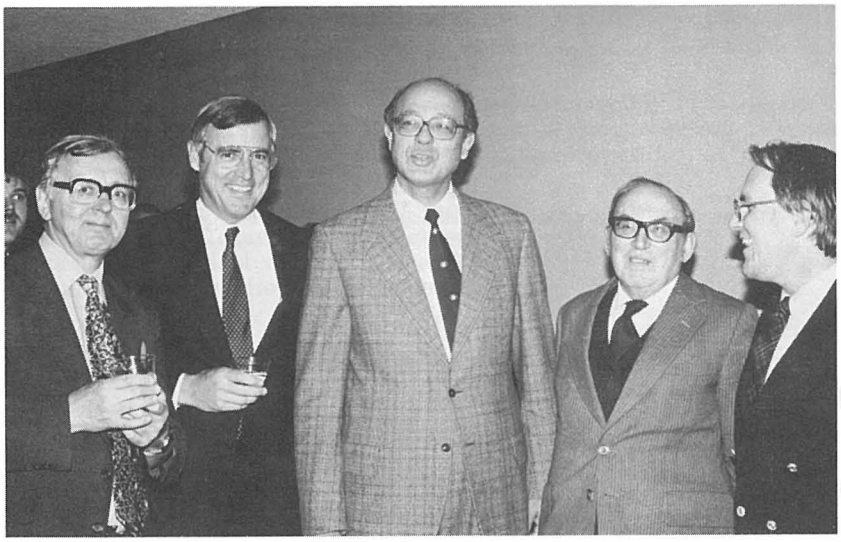
Zuse illustrating the structure of the Z1 through Z4



James Wilkinson, April 14, 1981
The Design and Use of the Pilot ACE

"Right from the very start, Turing was very obsessed with getting the maximum possible speed. That wasn't the popular view at the time."

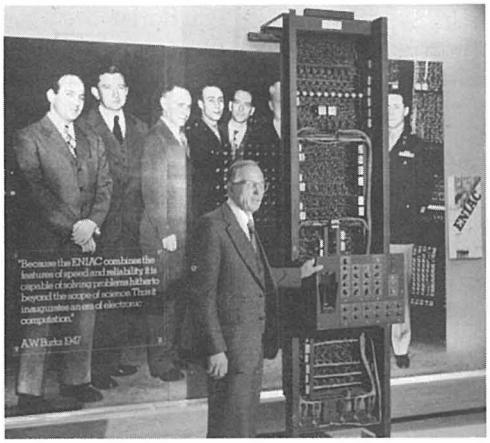
James Wilkinson, with Charles Cullinane, Charles Bachman, Maurice Wilkes, and Gordon Bell



David Edwards, September 9, 1981
The Evolution of the Early Manchester Machines

"F. C. Williams's contribution was that he recognized that if you looked at the patterns on the face of a tube after a millisecond, you could recognize what they were, and in looking at them you wrote them back again."

"In June 1948, when the baby machine ran, our confidence started to develop."



Arthur Burks, February 18, 1982
The Origin of the Stored Program

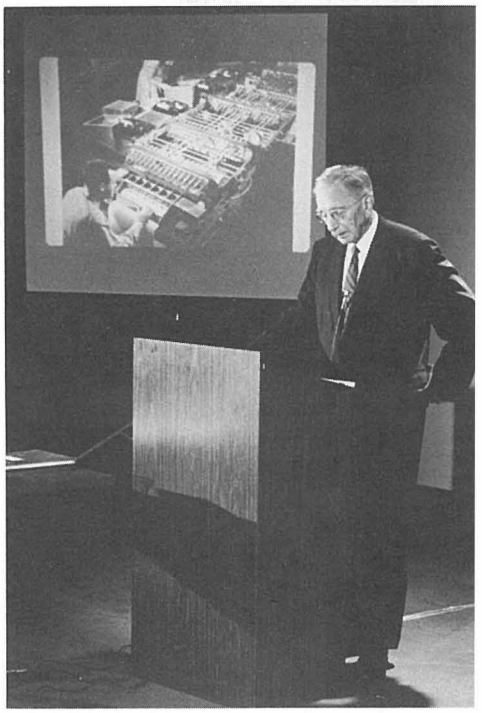
"This most important historical achievement [the stored program] did not come about in a straightforward way, but in a convoluted, indirect manner."

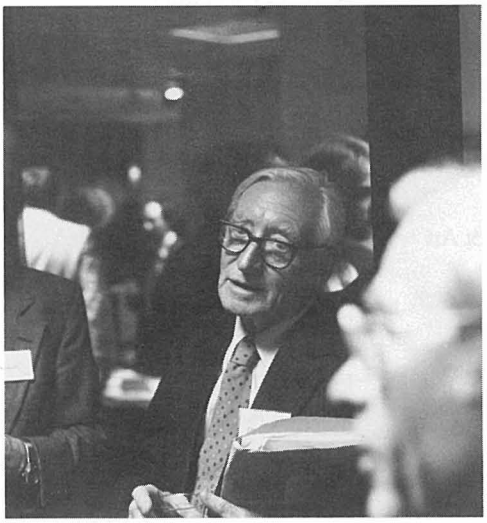
Arthur Burks and the function table of the ENIAC.

John Brainerd, June 25, 1981
Development of the ENIAC Project

"It was the world's first large-scale digital electronic general purpose computer. You have to put all those words in to tell something about it."

John Brainerd speaking of the impact of the Differential Analyzer.





T. H. Flowers, October 15, 1981
Design and Use of Colossus

"During World War II, I became involved in code-breaking activities for which I conceived and built machines which became known as Colossus. Colossus had features now associated with digital computers—semi-permanent and temporary data storage, arithmetic and logic units including branching logic and variable programming."

T. H. Flowers

Individuals are encouraged to participate in the activities of the Museum by becoming members. Kitty Selfridge is serving as the first chairman and Ed Galvin as the secretary. The membership group meets quarterly to coordinate activities. Committees have been formed to advise on the museum store (Dick Rubinstein and Carolyn Sweeney), excursions (Joan Lyle), and accessibility for the handicapped (Sandra VanHorn). Other committees will be developed as needs arise.

Members are encouraged to learn enough about the structure of the collection to guide tours. The Museum staff and certified docents provide scheduled training sessions. Present docents include Gordon Bell, Larry Cade, Steve Carter, Bruce Collier, Vernon Johnson, Ed Luwish, Jack Lucier, Ira Machefsky, Brian Randell, Dick Rubinstein, Peggy Sullivan, Rod Sutherland, Juanita Thiel, and Maurice Wilkes.

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Maurice Wilkes
James W. Woods
William A. Wulf

Until June 1984, when the Museum will have completed all the requirements for full status as a Charitable Foundation under Public Law 501(c)3, the opportunity exists for individuals and institutions to become Founders.

During these two years, we are seeking to develop a broad base of support from Corporations and Individuals involved with information processing. Corporate Founders ($2500) and individual Founders ($250) receive certificates and all privileges of membership.

This is a unique opportunity to help establish the only international museum devoted exclusively to computers and computing history.

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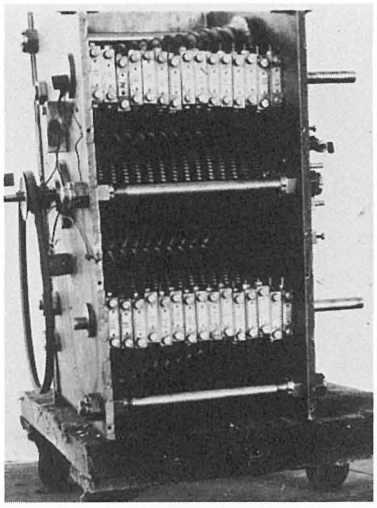
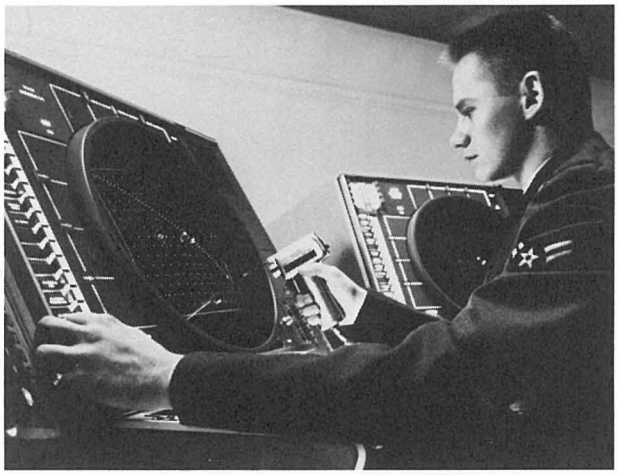
Digital
Computer
Museum



Wednesdays at 4 and
Sundays at 3
GALLERY TALKS AND WALKS
Special topics will be announced each week.

October 7 at 5 PM
LECTURE: HISTORY OF THE SIEVE MACHINES
D. H. Lehmer

Professor Emeritus University of California at Berkeley. With an exhibition of the electro-mechanical machine used for finding prime numbers exhibited at the Chicago World's Fair of 1932 and the 1950 electronic prime number sieve.



October 8–9
EXCURSION: ANFSQ7 and NATIONAL MUSEUM OF SCIENCE AND TECHNOLOGY

Friday noon leave Hanscom Field for North Bay, Canada. Visit and tour the ANFSQ-7, vacuum tube computer in operation on the SAGE early warning system. Hotel accommodations in Ottawa. Saturday morning tour of the Computing Exhibition, National Museum of Science and Technology. Saturday noon leave Ottawa for Hanscom Field, Bedford. Contact Chris Rudomin for more information.

October 22 at 5 PM
LECTURE: THE WATSON SCIENTIFIC LABORATORY, 1945–50
Herbert J. Grosch

As the first assistant to Wallace Eckert and director of the computing program, Herbert Grosch will provide a narrative of the development of the Columbia Laboratories up to the time of NORC.

CONTENTS