

Johnson is New Associate Director

After a year-long search, Stephen Johnson, a historian of science and technology, was named the new Associate Director of CBI.

He is in the fourth and final year of his doctoral program in the history of science and technology at the University of Minnesota. His dissertation, "The Origins, Development, and Diffusion of Systems Technologies in the American and European Space Programs," focuses on systems management in the U. S. Air Force, its further development in NASA, and its diffusion to the integrated European space programs.

Stephen comes to CBI with twelve years' experience in computing, research, and management in the aerospace industry.

After he received his Bachelor's degree from Whitman College in Physics, while he worked at the Naval Undersea Warfare Engineering Station in Keyport, Washington, Stephen then worked for Northrop Corporation in Southern California, and Martin Marietta in Denver, Colorado. He managed a simulation laboratory, worked on the design, test, and operations of the Magellan spacecraft probe to Venus, and was subsequently the principal investigator for a research program in dependable system technology.

While working on his doctorate, he was also a research associate for the University of Cincinnati's Space Engineering Research Center, and the co-owner and co-founder of Dependable Systems International.

Stephen began graduate studies in history at the University of Colorado, Denver, in 1987, and came to the University of Minnesota in the fall of 1992. His



Stephen Johnson

advisor is Dr. Arthur Norberg, former director of CBI.

At CBI, Stephen will be investigating the development of R&D management in the computer industry, particularly in its dependence upon military "systems management."

He will also investigate the historical development of computer fault tolerance and reliability.

Stephen's wife, Diane, is a manager at AT&T in Minneapolis. He has two children, Casey, 12, and Travis, 8. He is also a songwriter and poet.

Although his parents originally hailed from central Minnesota, and told him many tales of life in the frigid rural northland, Stephen, who grew up in the desert and mountains of eastern Washington state, is still adjusting to Minnesota's outdoor recreation, centered on water, frozen or otherwise!



ENIAC Extravaganza

The Philadelphia/University of Pennsylvania celebration of the 50th anniversary of the ENIAC on February 14, 1996 began with a speech, "The Technology Challenge: Sparking Innovation in American Business," by Vice-President Albert Gore. Gore pointed out that it was fitting that the Information Age originated in the same city where the nation began two hundred and twenty years ago. He then walked to the Moore School of Engineering, and switched on the ENIAC to formally open the 50th Anniversary celebrations. The speed of the calculations he triggered were slowed down so they could be watched by the audience. The first set of numbers added up to "46," and then the number 50 was added to arrive at 96.

Judith Rodin, the President of the University of Pennsylvania, emceed the ENIAC banquet. Speakers included the mayor of Philadelphia, representatives of the postal service who announced the issue of a commemorative stamp, and Charles Babbage Foundation Trustee William Wulf, who described the new capabilities offered to scholarship in the humanities by computer technologies. Information technology, he argued, is a lever with which we can move the world. Video, sound, and photoclips accompanied the four courses of the banquet, which concluded with a laser light show.

Historical Sessions

A number of historical sessions organized by Tim Bergin of the ACM

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Recent Publications

Abbate, Janet, "People and Computers and the Computer Museum," in *Technology and Culture* 34 (July 1993): 665-669.

Abbate, Janet, "From ARPANET to Internet: A History of ARPA-Sponsored Computer Networks, 1966-1988," (University of Pennsylvania Ph. D. Dissertation, 1994).

Bodmar, John W., "The Military Technical Revolution from Hardware to Information," in *Naval War College Review* 46 (Autumn 1993): 7-21.

Brown, Carol Christy, *Plugged In: 40 Years of Digital Imaging*, (M.F.A. Thesis, Rochester Institute of Technology, 1994).

"The CAD Revolution: A 20-Year Saga," in *Compressed Air* 98 (Oct-Nov 1993): 40-44.

Caminer, David, John Aris, Peter Hermon and Frank Land, *User-Driven Innovation: The World's First Business Computer*, (New York: McGraw-Hill, 1996).

CHARLES BABBAGE INSTITUTE NEWSLETTER

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Campbell-Kelly, Martin, *Computer: A History of the Information Machine*, (New York: Basic Books, 1996).

A Case History of the Space Shuttle Onboard Systems Project, (Sematech, Inc., 1994).

The CGNET Story: A Case Study of International Computer Networking, (Ottawa: International Development Research Center, 1994).

Christensen, Clayton M., "The Rigid Disk Drive Industry: A History of Commercial and Technological Turbulence," in *Business History Review* 67 (1993): 531-588.

Churchhouse, R. F., "The Achilles Heel of the ENIGMA Cipher Machine and Some of its Consequences," in *Bulletin-Institute of Mathematics and its Applications* 29, (Sept-Oct 1993): 129-135.

Churchhouse, R. F., "Experience with Some Early Computers," in *Computers and Control Engineering Journal* 4 (April 1993): 63-67.

Ciborra, Claudio U., *Teams, Markets, and Systems: Business Innovation and Information Technology*, (Cambridge: Cambridge University Press, 1993).

Copeland, Duncan G., Richard O. Mason, and James L. McKenney, "Sabre: The Development of Information-Based Competence and the Execution of Information-Based Competition," in *Annals of the History of Computing* 17:3 (1995): 30-57.

Cortada, James W., *A Bibliographic Guide to the History of Computer Applications, 1950-1990*, (Westport, Conn: Greenwood Press, 1996).

Cortada, James W., *Information Technology as Business History: Issues in the History and Management of Computers*, (Westport, Conn: Greenwood Press, 1996).

Costello, John, "As the Twig is Bent: The Early Life of John Mauchly," in *Annals of the History of Computing* 18:1 (1996): 45-50.

Couleur, John, "The Core of the Black Canyon Computer Corporation," in *Annals of the History of Computing* 17:4 (1995): 56-60.

Davidson, Clive, "The Man Who Made Computers Personal (Alan Kay)," *Continued on page 4*

ENIAC...

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sought to place the invention of the ENIAC in historical perspective. Babbage Fellow Paul Ceruzzi discussed "The ENIAC and the Myth of the 'Computer Revolution'." Paul compared the revolution produced by ENIAC with a number of other transitions in the history of computing, and concluded that it was more meaningful to regard the field as in continuous revolution. ENIAC pushed the 'calculating' function of computing machines way ahead of all the others, stimulating innovation in data storage, output and other functions, including the stored program.

Mike Williams, editor of the *IEEE Annals of the History of Computing* described the ENIAC architecture, illustrating his description with props from the original machine and a newsreel film of the ENIAC in action.

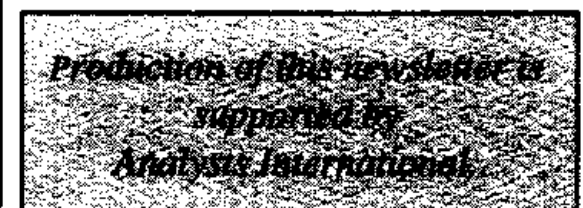
Mitch Marcus, head of the Computer Science Division of the University of Pennsylvania, outlined the conceptual shift from a calculator to a computer.

David Allison's talk, "Using the Computer: Episodes Across 50 Years," described three episodes of computer usage from the ENIAC to the present.

Professor Michael Mahoney analyzed "The New Science of Computing," from its origins before World War II, through the work of Claude Shannon and Norbert Wiener, to the convergence of a wide variety of scientific and technical agendas to produce computer science.

Maurice Wilkes delivered the keynote address of the ACM conference on Friday, February 16. He was introduced by CBF Trustee Tony Oettinger. Wilkes referred to his Turing Lecture of 1967 and concluded that, "There was no stability in the computer world in 1967, and we have no stability now. If another anniversary celebration is held in 25 years, he or she will be able to say then that there is still no sign of the computer

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Mel Kranzberg



Dr. Melvin Kranzberg, one of the original Trustees of the Charles Babbage Institute, Professor at Georgia Institute of Technology, and a consistent and enthusiastic supporter of CBI, died on December 5, 1995, after a battle with cancer. Mel gave generously of his time, advice, and support to CBF and CBI, serving as a member of the Board of Trustees, the Board of Directors, as chairman of the Fellowships Selection Committee and as a member of the Development Committee. His direction and advice has been one of the most important elements in the success of the Institute over the years.

Mel earned his bachelor's degree in history and economics from Amherst College and his Ph.D. from Harvard in history. He earned a Bronze Star for his service in Europe. He then taught at Harvard, Stevens Institute of Technology, Amherst, and Case Institute of Technology before moving to Georgia Institute of Technology in 1972 as the Callaway Professor of the History of Technology. He retired in 1988. Georgia Tech has named a professorship in the history of technology in his honor.

He was a founder of the Society for the History of Technology, where his openness and warmth made the new field of the history of technology one of the more delightful additions to the academic scene. He was a productive member of a dozen other professional organizations and received many awards

Integrating the Archives at DEC

By Craig G. St. Clair
Corporate Archivist and Manager of
Corporate Collection, Digital Equipment
Corporation

Archives in modern American corporations are often isolated. They are typically the place of last resort: where you send the plaque or artifact that no one wants but no one wants to throw out or where you go to find that elusive piece of information.

At Digital Equipment Corporation, we've embarked on a program to integrate archival information into other streams of information available to employees.

Digital started its archives three years ago. The archives was designed to document the company's growth and development and to gain intellectual control over the company's vast store of permanent records. From the beginning, the archives collected records about the company's technological advances in interactive computing, innovations in computer networks and the progress in information processing from PDP-1 to VAX to Alpha.

When we began to think about ways to integrate the archives with the rest of the corporation, the company's internal culture and technological orientation -- its systems base, fondness for new technology and preferred method of communicating -- helped to build an integrated archives. All sorts of archival information could be received and delivered via the company's internal computer network.

Our aim was to make information about all aspects of DEC integrated seamlessly with other sources of company and external information, and to make them available at the employee's desktop.

and honors, including the Leonardo da Vinci Prize.

As our voluminous, lively, and insightful correspondence with Mel can attest, he took pleasure in his service to CBI. He was as delighted to see and be part of the growth of the history of computing as he was with the history of technology as a whole. We will sorely miss his humor, enthusiasm, tact, and wisdom. □

The first step was to fold our small stand-alone archives database into the on-line catalog for the Digital Library Network so that a search on Digital's VAX computers will turn up published materials from the lending library, videotapes from a reference library, and executive memoranda, marketing materials and product documentation from the archives.

Our next step will be to begin to deliver archival information directly to the client via the internal electronic network. The Electronic Photo Library will enable clients to search for and view images from the photo library at their desktop and order high-resolution digitized images, hard copy negatives, slides and prints, or simply download images directly into presentations or reports.

Digitized images of archival photo-

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Fellowship Announcement

Postgraduate Fellowships, History of Science & Technology: The Centre de Recherche en Histoire des Sciences et des Techniques in Paris announces two to three postgraduate, 6-month to 1-year positions for the year 1997. Younger scholars performing work in the history of 19th and 20th century science and technology are encouraged to apply. A good command of French is required. Gross monthly salary is usually around ff13,000. Travel to France not included. Deadline for applications is April 30, 1996. Letters of application, accompanied by a complete curriculum vitae, a list of publications, a brief statement of the proposed research (in French) and 2 letters of recommendation should be sent to:

John Krige, directeur
C.R.H.S.T., Cité des Sciences et de
l'Industrie
75930 Paris Cedex 19, France
tel: 1.4005 75 52
fax: 1.4005 79 21 □

Recent Publications...

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in *New Scientist* 138, (June 19, 1993): 32-5.

De Diego, Emilia, *Historia de la Industria en España la Electrónica y la Informática*, (Madrid: Escuela de Organización Industrial, Editorial Actas, 1995).

De Wit, Dirk, "Caught Between Historical Experience and High Hopes: Automation at the Dutch Postal Cheque and Clearing Service, 1950-1965," in *Annals of the History of Computing* 17:2 (1995): 9-21.

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"Discussion on the Code Breaking Computers of 1944," in *IEEE Proceedings A: Science, Measurement, and Technology* 140 (May 1993): 237-248.

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Ehrbar, Al, *The Verbatim Story: The First Twenty-Five Years*, (Lyme, Conn: Greenwich Publishing Group, 1995).

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Froschl, Karl, *Symbolverarbeitende Maschinen: Eine Archäologie*, (Steyr: Museum Arbeitswelt, 1993).

Goldstine, H. H., and A. Goldstine, "The Electronic Numerical Integrator and Computer (ENIAC)," in *Annals of the History of Computing* 18:1 (1996): 10-16.

Greenberg, Keith Elliot, *Steven Jobs and Stephen Wozniak: Creating the Apple Computer*, (Woodbridge, Conn: Blackbirch Press, 1994).

Greenstein, Shane M., "Lock-in and the Costs of Switching Mainframe Computer Vendors in the US Federal Government in the 1970s," in *Annals of*

the History of Computing 17:3 (1995): 58-66.

Grier, David, "The ENIAC, the Verb "to program" and the Emergence of Digital Computers," in *Annals of the History of Computing* 18:1 (1996): 51-55.

Hine, Christine, "Representations of Information Technology in Disciplinary Development: Disappearing Plants and Invisible Networks," in *Science, Technology, and Human Values* 20 (1995): 65-85.

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Information Infrastructures Sourcebook, Version 5.1 (Cambridge, Mass: Information Infrastructure Project, Science, Technology, and Public Policy Program, Center for Science and International Affairs, John F. Kennedy School of Government, Harvard University, 1995).

Jankowska, Maria Anna, "Computer Technology in Eastern European Countries and the Former Soviet Union," in *Reference Services Review* 21:2 (1993): 59-70.

Kahn, David, "An Enigma Chronology," in *Cryptologia* 17:3 (1993): 237-246.

Kaplan, Bonnie, "The Computer Prescription: Medical Computing, Public Policy, and Views of History," in *Science, Technology, and Human Values* 20 (1995): 5-38.

Kaplan, Jerry, *Startup: A Silicon Valley Adventure*, (Boston: Houghton Mifflin, 1995).

Kendall, Martha E., *Steve Wozniak -- Inventor of the Apple Computer*, (New York: Walker, 1994).

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Kittler, Friedrich, "There is No Software," in *Stanford Literature Review* 9:1 (1993): 81-90.

Krueger, Alan B., "How Computers Have Changed the Wage Structure: Evidence from Microdata, 1984-1989," in *Quarterly Journal of Economics* 108 (Feb. 1993): 33-60.

Lacy, Dan Mabry, *From Grunts to Gigabytes: Communications and Society*, (Urbana: University of Illinois Press, 1996).

Larson, Mel, "The Runner: The Slide Rule Runner, Indicator or Cursor, with Special Reference to those Used by Keuffel and Esser," in *Journal of the Oughtred Society* 2 (March 1993): 40-48.

Lee, J. A. N., "On 'Babbage and Kings' and 'How Sausage Was Made': And Now for the Rest of the Story," in *Annals of the History of Computing* 17:4 (1995): 7-23.

Lee, J. A. N., "The Rise and Fall of the General Electric Corporation Computer Department," in *Annals of the History of Computing* 17:4 (1995): 24-45.

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Lubar, Steven, *InfoCulture: The Smithsonian Book of Information Age Inventions*, (Boston: Houghton Mifflin, 1993).

McKenney, James L., "Developing a Common Machine Language for Banking: The ABA Technical Subcommittee Story," in *IEEE Annals of the History of Computing* 17:4 (Winter 1995): 61-75.

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MacKenzie, Donald, "The Automation of Proof: A Historical and Sociologi-

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50 Years of ENIAC Feted in Philly . . .

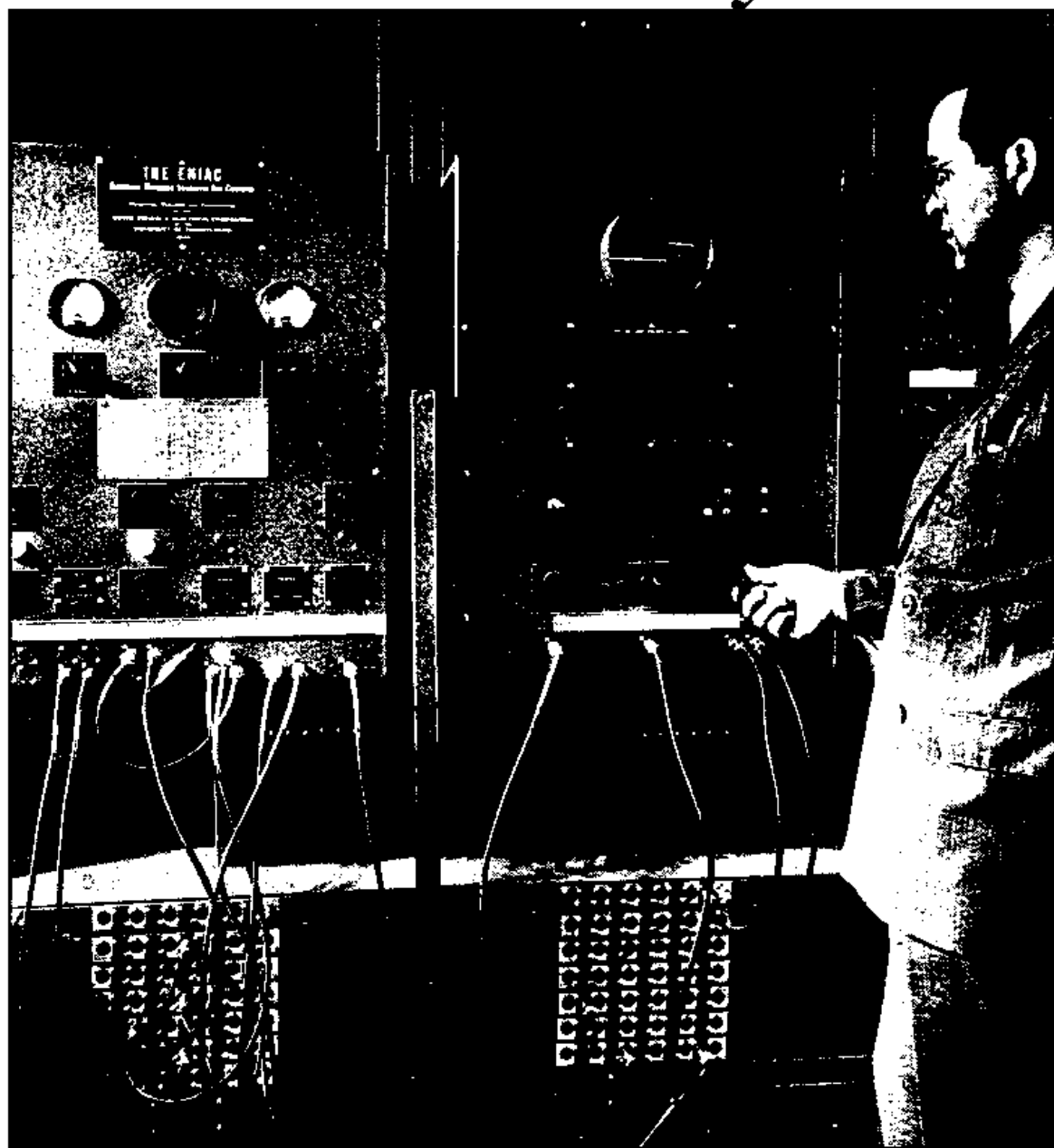
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field ceasing to be one of excitement and innovation."

In the history session that followed Wilkes' address, Tomash Fellow Atsushi Akera spoke on "John Mauchly and the Origins of Modern Computing," weaving together his formative years, his experience in the Moore School, and his contributions to ENIAC. Penn post-doctoral fellow Pap Ndiaye spoke on Eckert-Mauchly and the Defense Establishment. He argued that computers originated in a scientific and technological environment dominated by military agencies. The Eckert and Mauchly Computer Company (EMCC) sought, in contrast, a commercial computer. EMCC looked to the government for capital to develop their machine, and, failing to win Atomic Energy Commission or Office of Naval Research Support, they signed with the National Bureau of Standards to develop a machine for the Bureau of the Census. The accusations of subversive tendencies and affiliations leveled at NBS director E. U. Condon and at Mauchly led, Ndiaye argued, to the denial of security clearance and contracts to EMCC that might have enabled them to survive. When EMCC was taken over by Remington Rand, Retired General Leslie Groves expelled Mauchly from the company.

Friday's afternoon sessions dealt with software, and featured talks by Jean Sammet on the chronological development of programming languages, and CBF Trustee Peter Denning on operating systems.

The highlight of Saturday's history session was a 90-minute address by Alan Kay on "The Development of the Personal Computer." Kay reviewed the development of the "Mac" workstation, overlapping window interface, Smalltalk, Ethernet, laser printing, and "client-server" computing--including the accomplishments at the Xerox Palo Alto Research Center that have since been incorporated in personal computers. He argued that the Center's success was



The Initiating and Cycling units of the ENIAC (CBI archives).

based upon its ability to look 20 years ahead and foresee the consequences of Moore's Law.

The hardware history session featured Wilkes, who discussed systems such as the ENIAC, the EDSAC, and the von Neumann machine that defined the first principles of machine structure, and the evolution of the computer into highly pipelined systems such as IBM's Stretch, IBM's Model 91, and CDC's P6600, which pioneered the processor as we know it today.

Harry Huskey and Henry Tropp spoke on National Bureau of Standards computer development, especially the Standards Western Automatic Computer (SWAC) at the Institute of Numerical Analysis at UCLA.

The final session, "The Army, the

National Need and the ENIAC," featured talks by Herman H. Goldstine and Harry L. Reed, Jr., who reviewed the design and construction of ENIAC and reflected on its influences on numerical methods and the foundations of modern computing.

CBI Director Bob Seidel and Archivist Bruce Bruemmer participated in the planning for these sessions, which will be followed by a commemoration of the Moore School lectures on May 17 and 18 in Philadelphia, and a variety of other celebrations over the next 17 months. Participants in that session will include Bill Aspray, Janet Abbate, Atsushi Akera, and Pierre Mounier-Kuhn. Bob Seidel will chair a session on military funding of computers.

□

Recent Publications...

Continued from page 4

cal Exploration," in *Annals of the History of Computing* 17:3 (1995): 7-29.

MacKenzie, Donald, *Knowing Machines: Essays on Technical Change*, (Cambridge: The MIT Press, 1996).

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Malerba, Franco, "Technological Regimes and Firm Behavior," in *Industrial and Corporate Change* 2:1 (1993): 45-71.

Marcus, Mitchell, and Atsushi Akera, "Exploring the Architecture of an Early Machine: The Historical Significance of the ENIAC Machine Architecture," in *Annals of the History of Computing* 18:1 (1996): 17-24.

Marshall, David, *Bill Gates and Microsoft*, (Watford: Exley, 1994).

Martin, Dianne, "Myth of the Awesome Thinking Machine," in *Communications of the ACM* 36 (April 1993): 120-133.



Continued in the next issue...



The PDP-6 engineering team poses in front of their machine in 1964

Photo Courtesy of Digital Equipment

DEC Archives...

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graphs will be integrated in one catalog along with textual material from the archives and published material from the various reference libraries.

Electronic records will be linked to full text record collections so employees can search collections of press releases, executive interviews or company milestones by key word and then

download documents via the network.

Using available technology to document technological advances in a company driven by technology makes access to information held by Digital's libraries and Corporate Collections available along with external information such as news wires, journal databases, CD ROM databases and market research reports.



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