CHARLES BABBAGE INSTITUTE

CENTER FOR THE HISTORY OF INFORMATION TECHNOLOGY

NEWSLETTER
Vol. 35 No. 2
Fall 2013

In This Issue:

CHARLES BABBAGE INSTITUTE

CENTER FOR THE HISTORY OF INFORMATION TECHNOLOGY

NEWSLETTER **Fall 2013**
Vol. 35
No. 2

In This Issue:

***CBI Newsletter* Editor: Jeffrey R. Yost**

Charles Babbage Institute
211 Andersen Library
University of Minnesota
222 21st Avenue South
Minneapolis, Minnesota 55455

Email: cbi@umn.edu
Ph. (612) 624-5050
Fax: (612) 625-8054
www.cbi.umn.edu

Director's Desk

Computer history is getting larger, more diverse, and more interesting — with each passing year. And the Charles Babbage Institute continues to play a central role in the field and its ever-increasing vitality. Our basic mission is to "build an infrastructure" for computer history . . . with vital archival collections, unique oral histories, cutting-edge research and publications, and imaginative outreach activities.

The Babbage Institute publications machine is in top form, the crowning result for many of our research projects. This year CBI associate director Jeffrey Yost played a key role in revising the landmark volume *Computer: A History of the Information Machine*, while I published *Digital State: The Story of Minnesota's Computing Industry* — each described elsewhere in this newsletter. We have drafted a book-length narrative about the NSF FastLane project that will be moving into the publication process soon.

Our oral history process is also in high gear. For our NSF-sponsored project on the history of computer security, we have conducted nearly two-thirds of the project's planned 30 oral history interviews. The results of many of these interviews are already available on the CBI oral history database (look for already-posted interviews with Roger Schell, Barry Schrager, Rebecca Bace, Steve Lipner, David Bell, Tom Van Vleck, Steve Walker, Eldon Worley, and others coming soon). We are moving more than 600 of our FastLane interviews, where we have the interviewee's permission, also into public visibility and access.

We report elsewhere on the prominence of computer history at the annual meeting of the Society for the History of Technology, held earlier this month in Portland, Maine. That society's journal, *Technology & Culture*, also gives evidence of unusual visibility for our field: computer history articles constitute three of the four top-downloaded articles, included ones by former CBI-Tomash fellows Nathan Ensmenger on "The Digital Construction of Technology" and Paul Ceruzzi on "Moore's Law and Technological Determinism." There are "heavy downloads" also for the just-published article by CBI senior research fellow James W. (Jim) Cortada on "How New Technologies Spread: Lessons from Computing Technologies."

Also in this newsletter, CBI archivist Arvid Nelsen provides an update on archiving projects that he's overseeing. One initiative that I am especially delighted to see is the massive cataloguing of book and serial accessions. You may recall our excitement with the Tomash, Mahoney, Machover, and Cortada collections that boosted CBI title count from around 2,000 to well over 10,000. Books and serials from the Cortada collections are making their way through cataloguing and will soon be visible to the world through the main University of Minnesota Library Catalog and, also, in on-line union catalogs such as WorldCat.org. We anticipate when the other three collections also get this splendid treatment.

Computer history is experiencing an exciting and expanding period of growth. Our members' support of the CBI Friends helps keep us at the forefront of the field. You, too, can join the excitement today!

Thomas J. Misa

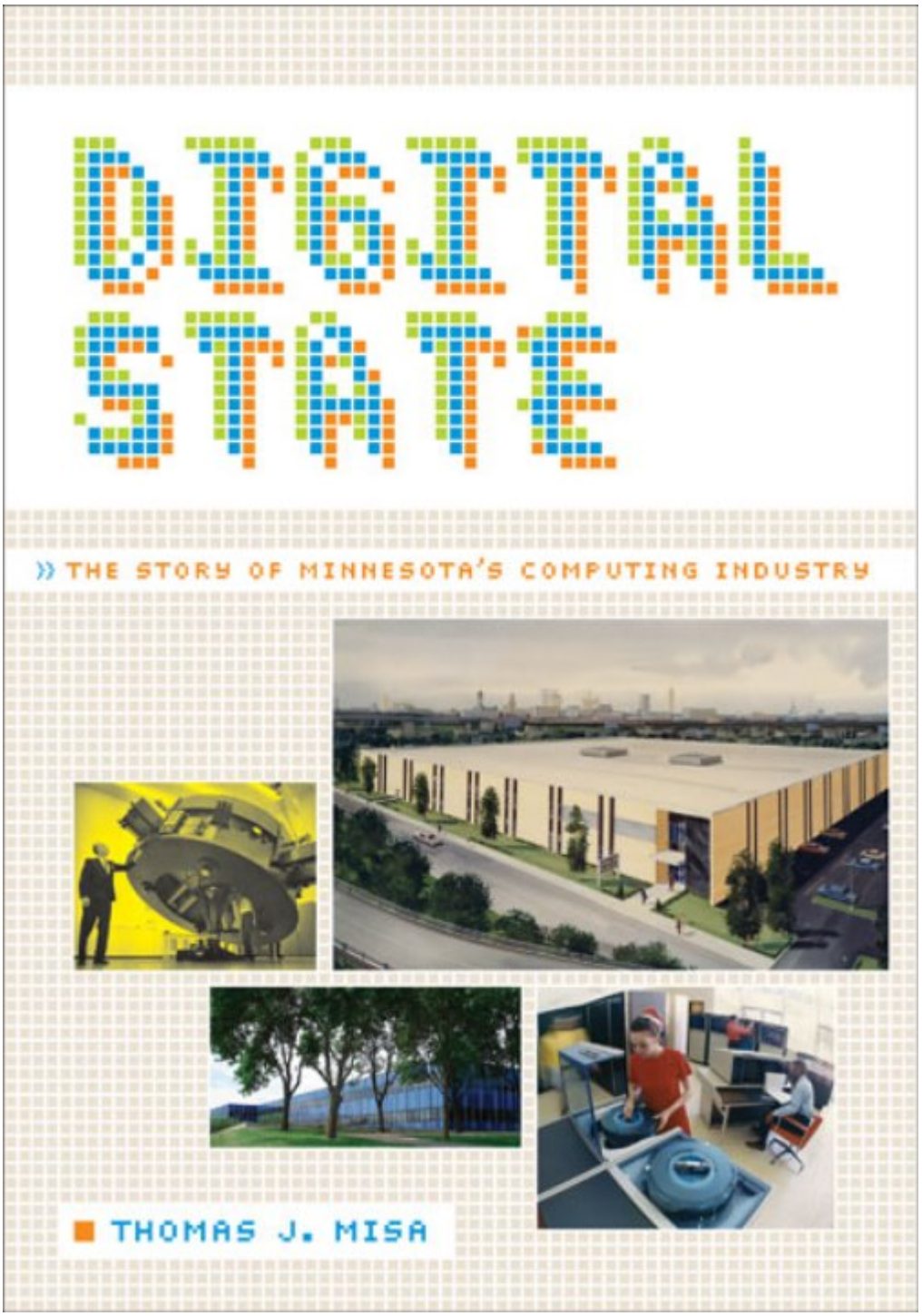
Digital State Published

Sometimes, a "perfect" project comes our way. The recipe might read: Take an irresistible and mostly unexplored historical topic, add rich archival and oral history sources also mostly untapped, leaven with a dose of regional interest and outreach to the community, and locate an enthusiastic academic publisher with the rare ability to publish a book with more than 100 photographs for less than $30. This is the happy situation of CBI director Thomas Misa's latest book, entitled *Digital State: The Story of Minnesota's Computer Industry*, just out from the University of Minnesota Press.

Minnesota's notable computing industry may be familiar to some long-time readers of the *CBI Newsletter*. After all, the state's prominence in computing helped originally bring CBI to the University of Minnesota in 1980. From the mid-1950s through the 1980s, Minnesota had an unusually active and nationally prominent computer industry. From the pioneering Engineering Research Associates, formed in 1946, came the Univac division of Sperry Rand, a computing powerhouse in government and air-traffic control. A 1957 spin-off from there resulted in Control Data Corporation, the notable supercomputer company. And by 1960 IBM–Rochester and Honeywell were each adding additional computing muscle to the region. A full-fledged "industrial district" centered on computing had taken form, creating also dozens of smaller specialized supplier companies and interacting with such regional giants as General Mills and 3M. *Digital State* tells the entire story, relating also the important roles played by the Minneapolis Federal Reserve, the regional economy, and the University of Minnesota.

An important lesson that *Digital State* conveys for "high tech" districts today is the critical, but often behind-the-scenes role played by specialized suppliers and engineering and design companies. They flourished with active business from the state's computer industry for three decades, then in recent years have helped propel the state's medical-device industry to national prominence. The book contains firm-level data on nearly 250 Minnesota high-tech firms, including such unsung heroes of the regional economy as Hutchinson Technology, which was formed in a chicken coop and has gone on to employ 3,000 Minnesotans in the hyper-specialized world of precision assemblies for disk-drive units and medical devices.

You can find more at <http://www.upress.umn.edu/book-division/books/digital-state>, but then you can also get a copy — while having the satisfaction of supporting the Charles Babbage Institute — by joining the CBI Friends at any level. (You'll receive the four quarterly issues of *IEEE Annals of the History of Computing* as well.) Misa will do a book signing at Magers & Quinn, in downtown Minneapolis, from 7 to 8.30 pm on November 8th and has scheduled numerous talks to local groups.

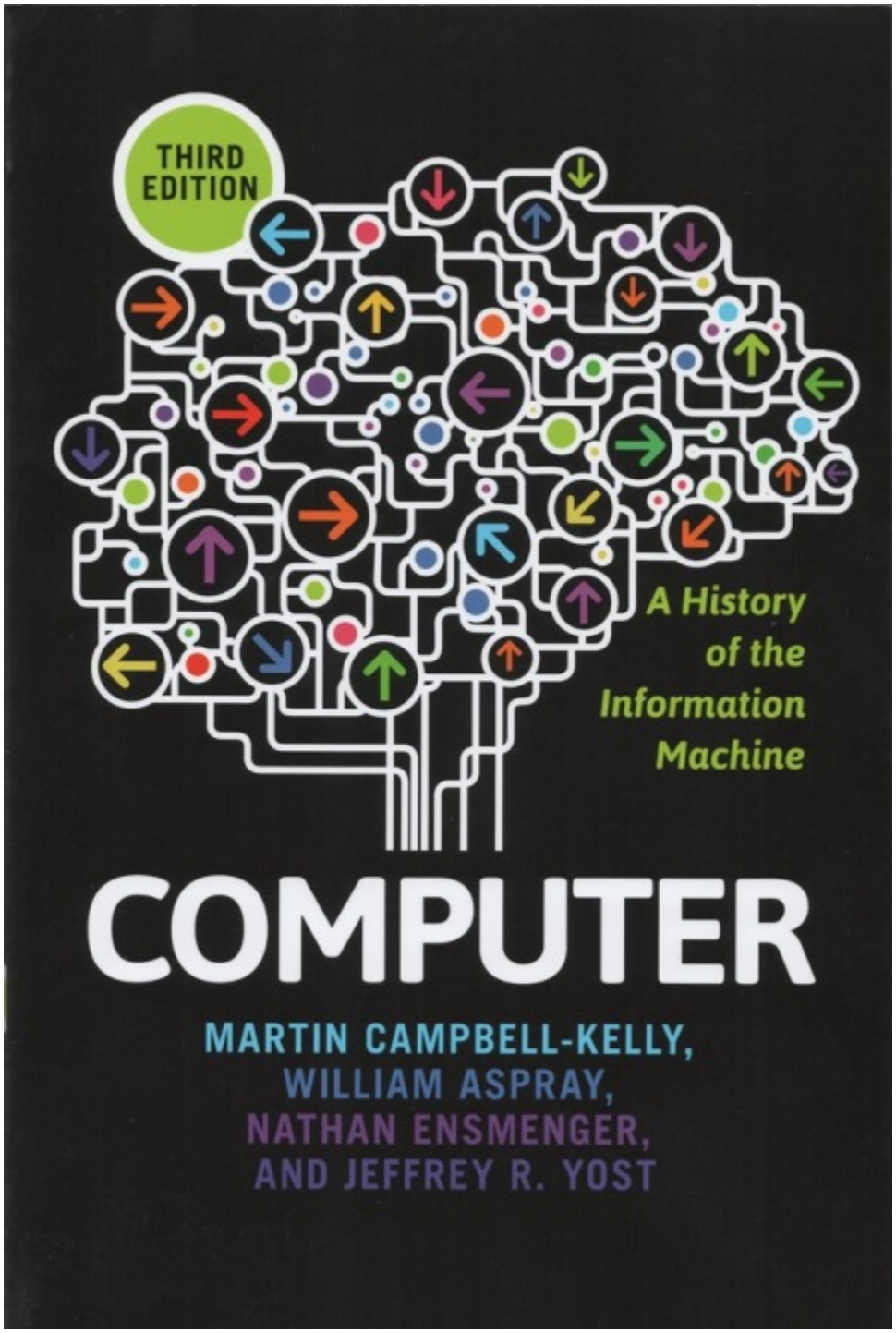

DIGITAL STATE
» THE STORY OF MINNESOTA'S COMPUTING INDUSTRY
THOMAS J. MISA

Yost an Author on *Computer* (*Third Edition)*

Martin Campbell-Kelly, William Aspray, Nathan Ensmenger, and CBI associate director Jeffrey Yost authored the third edition of *Computer: A History of the Information Machine*, which was published in July 2013 (Westview Press). The first edition, written by Campbell-Kelly and Aspray, was published in 1996 by Basic Books (Perseus Books Group). The book, part of the Sloan Technology Series, has sold more than 35,000 copies and has become a true classic as a scholarly, but highly accessible, survey of computer and software history. *Computer* quickly became the most commonly used textbook for computer history courses, and has also been used in a number of other information technology-related courses nationally and internationally. Campbell-Kelly and Aspray published the second edition with Westview Press (the textbook imprint of Perseus Books Group) in 2004.

At the time of the first edition of *Computer*, the World Wide Web was in its infancy and the first commercial Web browsers were less than two years old. Fewer than one-fifth of Americans had cell phones and most of these people used these devices solely for making and receiving calls. Obviously, computer technology has rapidly evolved since then (and even since the second edition). Over this period, historical scholarship on computing has also gained momentum with a growing scale and scope of books and articles every year. Approaches to computer history have changed markedly in recent years—with scholars giving ever more attention to the social, cultural, and business history of computing, and to the experiences of users. To harness new perspectives, Campbell-Kelly and Aspray invited Ensmenger and Yost to join them as authors for the third edition.

In addition to carefully updating all aspects of the third edition to reflect current literature, understandings, and contexts, the authors have added extensive new material on the history of the programming profession, social networking, and mobile computing. The third edition also expands coverage on the evolving IT industry with discussion on the rise of Google and Facebook, and how powerful applications are changing the way we work, consume, learn, and socialize. As such, the extensively revised third edition stands to expand its range of classroom use (in history, sociology, political science, science and technology studies, and other academic departments as well as in information schools, business schools, and law schools) and to introduce a new generation of students and other interested individuals to the history of computers, software, and networking. The book is available from Amazon.com at <http://www.amazon.com/Computer-History-Information-Machine-Technology/dp/0813345901>.


THIRD EDITION
A History of the Information Machine
COMPUTER
MARTIN CAMPBELL-KELLY,
WILLIAM ASPRAY,
NATHAN ENSMENGER,
AND JEFFREY R. YOST

News from the Archives

Computing Educators Oral History Project

CBI is moving forward in its partnership with the Computing Educators Oral History Project (CEOHP) to collect, preserve, and make accessible the oral histories conducted by the project. The CEOHP began in 2003 as a grassroots project with a primary purpose of highlighting the voices and perspectives of female computing educators, aiming to provide positive role models to girls and women considering careers in computing and hoping to correct the declining numbers of women in the field. Edited audio, video, and transcripts are currently available on the CEOHP's website hosted at Southwestern University (http://cs.southwestern.edu/OHProject/index.html). In 2010 CBI entered into an informal agreement to serve as the project's long-term preservation and access repository, and we are now initiating the acquisition of files which will be made available through the University of Minnesota Libraries. This project represents CBI's first entirely born-digital collection, consisting of audio, video, and textual files. It includes both edited products intended for publication and raw archival materials, which will be preserved with limited or restricted access according to agreements made with the interview participants. We are excited to be partners in this important project. Look forward to more news as materials go online.

Dr. Stephen J. Lukasik to Donate Materials to CBI

Dr. Stephen J. Lukasik's career – begun in 1952 and continuing to this day – represents incredible contributions to the multifaceted field of national security. Dr. Lukasik's professional positions have included serving as the director of the Advanced Research Projects Agency (ARPA) 1971-1974 (and deputy director prior to that), chief scientist at the RAND Corporation and the Federal Communications Commission, and vice president at Xerox Corporation, Northrop Corporation, and TRW, Inc. He has served in leading advisory positions for the director of Central Intelligence Science and Technology Advisory Panel, the Joint Strategic Targeting Planning Staff – Strategic Advisory Group, and the Defense Intelligence Agency Advisory Committee. He is the author of numerous publications and reports. This list is by no means comprehensive.

I had the opportunity to visit Dr. Lukasik and his wife Ginny at their DC-area home this past September. While I was there I had the pleasure of speaking with him about the role computing played in the many facets of national security with which he has worked throughout his career, in areas including national threat assessment, smart weapons, nuclear test detection, "red teaming," command and control, and cyber conflict, among others. Dr. Lukasik's collection of personal papers and published books offers special insight into this incredibly fascinating and important line of work. CBI is honored that he has bequeathed his materials to the University of Minnesota's Charles Babbage Institute. One day this material will prove immensely valuable to CBI's research communities. While Dr. Lukasik continues to work with – and add to – his collections, I hope to have further opportunities to visit them and to begin working with some of the materials, and to learn more from him.

Outreach and Instruction

Fall 2013 is turning out to be a busy semester for outreach and instruction as new researchers and classes seek out the rich and unique materials at CBI. The Minneapolis

College of Art and Design brought a group of student into the Elmer L. Andersen Library – home to CBI and other units in the Libraries Department of Archives and Special Collections – to learn about collections of photographs and other visual materials. Students were shown how corporate photography collections portray both the spontaneous moments in the life of a company and the staged scenes that are intended to create and portray a particular image. Students also examined the evolution of overt and implicit messages in advertising as revealed in the Burroughs Corporation's Advertising Samples, 1904-1986. Later in the semester three different courses will be examining materials in the Social Issues in Computing Collection, including Ethics in Science & Technology, The Use & Misuse of the Computer, and American Science and Technology in the Past Century.

R. Arvid Nelsen

European Computer Networking Oral Histories

Andrew Russell, past CBI Tomash fellow and current Stevens Institute of Technology assistant professor in the College of Arts and Letters, launched a 2012 oral history project entitled "European Contributions to Computer Networks." The project, funded by the Association for Computing Machinery History Committee, resulted in nine oral histories conducted by Russell with French networking pioneers. The first eight—Tilly Bayard-Richard, Najah Naffah, Louis Pouzin, Marc E. Levilion, Michel Gien, Jean-Louis Grangé, Gérard Le Lann, and Rémi Després—are now available online from CBI on the University of Minnesota's Digital Conservancy. Russell's interview with André Danthine will soon be added to the others on the Conservancy.

Gérard Le Lann, Jean-Louis Grangé, Michel Gien, Najah Naffah, Louis Pouzin, and Andrew Russell

The Louis Pouzin oral history (and several others in this series) richly details the origin, development, and deployment of the CYCLADES network in the early to mid-1970s.

Sponsored by the Institut de Recherche en Informatique et en Automatique (IRIA) and directed by Louis Pouzin, this influential "datagram" packet-switching computer network provided an alternative to ARPANET and was a test bed for networking research and experimentation. These interviews also explore the interactions of French, British, and American networking researchers, as well as the politics behind the ultimate demise of CYCLADES at the end of the 1970s.

Russell's interview with Després highlights the Transpac network and the birth of the X.25 recommendation at CCITT in 1976, while his interview with Tilly Bayard-Richard addresses the work and leadership of ISO committees creating standards for Open System Interconnection (OSI), as well as gender and the European networking research community. Ultimately this set of oral histories provides an infrastructure for fuller understanding of French and European computer networking research and standard setting work of the 1970s and 1980s. They richly complement CBI's many oral histories on developments in the U.S. with the ARPANET and internet. We are grateful to Andy for donating these valuable oral histories to CBI.

Jeffrey R. Yost

Lécuyer Named CBI Senior Research Fellow

We are very pleased to announce the appointment of Christophe Lécuyer as senior research fellow at the Charles Babbage Institute. Christophe needs little introduction to anyone who has been following the history of computing. He is author of the prize-winning *Making Silicon Valley: Innovation and the Growth of High Tech, 1930-1970* (MIT Press 2006), a deeply researched and carefully constructed examination of California's world-famous industrial district. His book demonstrates the deep historical roots of this hot spot in innovation, beginning with the San Francisco region's prominent radio industry and the electronic component manufacturers that sprang up around it. *Making Silicon Valley* won the inaugural prize awarded by SHOT's SIGCIS, named to honor the Computer History Museum. As the prize citation noted, "by focusing on the diverse networks of innovative firms—including Eitel-McCullough, Litton, Varian, Fairchild, Intersil, National, Intel and others—Lécuyer provides a compelling historical account . . . . *Making Silicon Valley* will be required reading for scholars in computing history as well as anyone seeking to understand the peculiar chemistry and culture of innovative regions." <http://www.sigcis.org/node/89>

Christophe's publications further develop his interest in high technology innovation. With David Brock, he published *Makers of the Microchip: A Documentary History of Fairchild Semiconductor* (MIT Press 2010). It gives a unique insider's view into the company during some of its most innovative years. "With an astute selection of the key documents, together with technically and historically informed commentary, this book documents the critical first four years (1957-61) of Fairchild Semiconductor, as the company's young engineers and scientists moved from research results to reliable practice in making silicon semiconductors" noted Bill Aspray, former CBI associate director. *Makers of the Microchip* just won the 2013 SHOT Ferguson Prize for

"outstanding and original reference work that will support future scholarship in the history of technology."

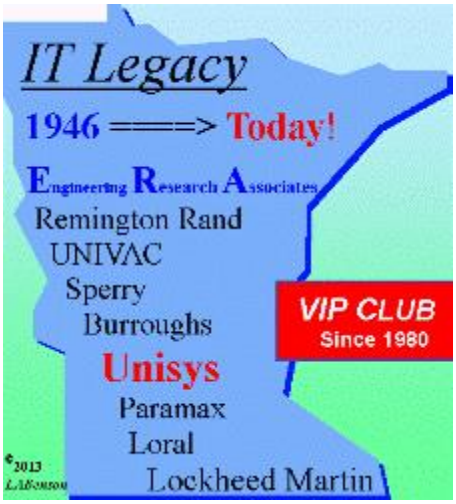
A spin-off of sorts was an article on "The Materiality of Microelectronics," appearing in the journal *History and Technology* (2006) as well as the special issue of that journal on "High Tech Manufacturing" (2010) assembled also by Lécuyer and Brock. That special issue featured an article by CBI's associate director Jeffrey Yost on "Manufacturing Mainframes: Component Fabrication and Component Procurement at IBM and Sperry Univac, 1960–1975."

It is late-breaking news that Christophe was recently named Professor of the History of Science and Technology at the Université Pierre et Marie Curie. Our congratulations to Christophe for his new faculty post and for winning this prestigious book award. We look forward to collaborations across the Atlantic! For a more complete list of Christophe's publications, please see his CBI page at <http://www.cbi.umn.edu/about/lecuyer.html>.

Thomas J. Misa

A New Computer History Exhibit

On 14 August 2013, the Dakota County Historical Society (DCHS) opened an exhibit at their Lawshe Museum in South St. Paul, MN. Titled "From ERA to Lockheed Martin: Minnesota's Computer Industry," the exhibit presents a remarkable story of technological innovation and contribution to the computer industry. In 2005, the Twin Cities Lockheed Martin (LMCO) branch and the retirees VIP Club had formed an Information Technology (IT) Legacy committee to gather and catalog hardware artifacts and documents to preserve local computer history.



When LMCO announced their Eagan facility closing in 2010, committee member Bernie Jansen asked the DCHS to become the permanent repository of our legacy artifacts and to exhibit them.[1] Chad Roberts, then the DCHS executive director, toured the Eagan plant; understood the significance of this computer systems history; and set up the DCHS exhibit vision.

The Lawshe Museum entryway poster reads as follows:
"Most of the history of computers is focused on the contributions from Silicon Valley in California, but Minnesota also played an integral role in the computer industry; so much so that it could be considered the 'Silicon Valley' of the 50s and 60s. This rich history is

[1] Bernard Jansen is a DCHS Board Trustee and a VIP Club Member Emeritus.

analyzed in CBI Director Thomas Misa's new book *Digital State* (University of Minnesota Press, 2013)."

Minnesota's legacy in the computer industry began with Engineering Research Associates, Inc. (ERA) which was founded in 1946. The legacy continued with ERA's successor companies, which include Remington Rand (which acquired ERA in 1952), Sperry, Unisys, and Lockheed Martin. Over the years the corporate name of the company changed many times but its ingenuity endured. These companies have had a vital presence in the computer and defense industries.

In 2010 Lockheed Martin announced that it would close almost all Minnesota operations by the end of 2012, including its Eagan facility in Dakota County. This marked the end of an epoch of Minnesota's innovation in the computer industry.

With the Eagan facility closure, a large collection of artifacts – representing the companies' legacy – was donated to the Dakota County Historical Society. The collection includes objects from the 1940s up to the present day, covering all time periods in Lockheed Martin's history. There are archival records for once top-secret projects, naval computer workstations, pictures of early computer production, a Japanese airplane computer, and many other artifacts.

"We are honored to be able to help preserve this legacy of innovation through the preservation of these artifacts and the presentation of this exhibit," stated the DCHS Board of Directors.

One aspect of the exhibit and the Minnesota computer legacy are three configurations of AN/UYQ-70 workstations. The AN/UYQ-70 is the Naval Tactical Data Systems (NTDS) fourth generation standard computer (embedded microprocessors).[2] S/N 8000 UYQ-70 is now aboard the recently launched SSN-783 submarine, the USS Minnesota.

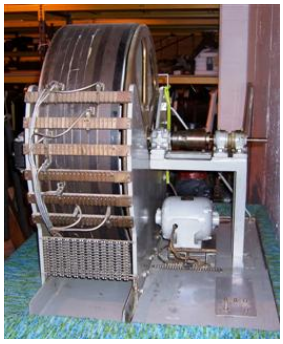
Photo courtesy of Keith Myhre

Long before the Q-70 was the AN/USQ-17, a first generation transistorized computer. Six were delivered to the Navy in 1958. In 1960, UNIVAC delivered the first of the 16 'service test' AN/USQ-20/CP642 computers for sea trials. UNIVAC delivered the first of 142 CP642A computers in the fall of 1961. In February 1963 UNIVAC delivered the first of the 241 AN/USQ-20B/CP642B computers. On April 21, 1969 Sperry delivered the first of over 3,000 second generation integrated circuit AN/UYK-7 processor units. Models of NTDS first and second generation computers are shown in this Lowell A. Benson photo, the Q-17 at the left and UYK-7 at the right.

[2]*When Computers Went to Sea: The Digitization of the United States Navy*, by Capt. David Boslaugh, USN Ret. relates the early story of NTDS.

On May 27th, 1983, the Navy awarded Sperry the third generation (VLSI and gate array logic circuits) AN/UYK-43 production contract. Over 400 US Navy ships received NTDS Command and Control systems with these computers and UNIVAC/Sperry-developed systems software.

Although the Lawshe Museum exhibit focuses on the defense industry aspects of this IT legacy, commercial aspects of the ERA to UNIVAC to Sperry to Unisys history in Minnesota are included on our web site, http://vipclubmn.org. Over a dozen shadow boxes showing the 1100 computer series technologies from the 1950s to the 1990s are in a hallway in the Unisys, Roseville plant.[3] The original ERA prototype drum is on display (photo at right) in the "Greatest Generation" exhibit at the Minnesota History Center. LMCO has also donated pallets of historical documents to the Charles Babbage Institute.



Courtesy of L.A. Benson

Lowell A. Benson (UNIVAC 1960 to UNISYS 1994), BBE, UMN, 1966
Unisys Lockheed Martin VIP Club
labenson@q.com

[3] http://vipclubmn.org/Articles/ATLASevolution.pdf published on the web August 2012.

Anthony Gandy: Reflections on the Tomash Fellowship

In 1989, I was honoured to receive the Adelle and Erwin Tomash Fellowship. At the time I was studying for my PhD at the London School of Economics, looking, somewhat naïvely, at the inability of the British electronics industry to compete in commercial markets. As you can imagine, such a research topic did not receive great support from the British electronics sector, and data was very scarce.

The one sub-sector which had some limited archival evidence in the public domain was the computer sub-sector. In isolation, it would have been possible to tell the story of the early British computer industry, but others were doing that, and they were better historians than me. What I needed was some insight into the competition between enterprises, primarily focusing on the reasons why the big integrated electronics companies had left the sector. However, in the UK there were few internal strategy papers, competitor analysis reports, or market evaluations.

Anthony Gandy, 1989-1990 Tomash Fellow

The Tomash Fellowship proved to be my saving grace. Professor Norberg and the wonderful archive team pointed me in the direction of the U.S. v. IBM Antitrust case papers (in the Computer and Communications Industry Association collection of antitrust records). This resource gave me the opportunity to undertake a comparative study. Indeed, there was the opportunity for two comparisons. The first was to consider the history of broad-based electronics firms within the computer sector and compare the histories of the US and the UK enterprises. Given the resources at the CBI and the records available in the UK, I put together cases on RCA and GE in the US, and Ferranti, EMI, and English Electric in the UK. It was also then possible to compare the strategies, capabilities, and limitations of these firms with the relative greater success (if measured by survival into the 1970s) of the business machine firms which also joined the early computer sector. These included the UK's ICT, the USA's Burroughs, NCR, Sperry Rand, and of course, Big Blue. Throw in cases on Honeywell and CDC as well and it was frankly no wonder that the 100,000 word limit for my PhD seemed ridiculously short!

The thesis focused on the problems of concentric diversification. It argued that firms with a number of businesses in related fields of high technology innovation will naturally face enormous competition if the core technology changes. For example, as valves give way to transistors, all units of the business will demand resources to offer the latest solid state devices. Then there was the shift to integrated circuits and the cycle started again. It was a neat idea to claim that concentric diversification was as dangerous to an enterprise in

related high technology fields as the much criticised conglomerate structure with its connotations of "financialisation" of decision making.

Do I think I made the case? Some enterprises did seem to show this problem. RCA's computer department seems to have been subject to resource feast and famine according to the investment cycles of more important (to RCA) divisions in television and capital electronics. However, others, while also seeing their computer departments subject to resource allocations determined by other divisions, had a wider technological base generating these resource restrictions. In the case of GE, the main competition came from non-electronics innovations, such as jet engines and nuclear power systems. However, the idea that high technology companies with multiple divisions all demanding resources for innovation, seemed to be worth further exploration. Twenty years after completing my PhD at LSE, and twenty years after I promised the publisher, I delivered a manuscript to Palgrave Macmillan which was published earlier this year as *The Early Computer Industry - Limitations of Scale and Scope*. They were the most forgiving of publishers!

I have also produced more theoretical cases for academic journals. In the journal *Business History*, I have recently published a paper on competition using compatibility as a source of competitive advantage. In this case, I looked at the RCA Spectra 70 systems with their compatibility with the then-new IBM 360, a strategy I call 'forward-compatibility' and compared it with the Honeywell strategy of compatibility with the previous IBM range, the 1401, which I dubbed 'backward-compatibility.' It is striking to think that the Honeywell strategy, despite its reference to an older technology was more successful in maintaining and rapidly growing their share of the market. I will soon have a paper published on the relationship of divisional decision making in the GE computer department and decision making at group level, focusing initially on the entry of the GE into the computer market, with a follow-up paper on the exit, based on the same data, currently in draft.

Interestingly, my research on the history of computing does not directly relate to my day job. For a number of years I was a financial/IT journalist, an investment banker, and, primarily, an independent consultant on financial technology markets. I now teach postgraduate studies at the *ifs* University College (whose heritage is based on the Chartered Institute of Bankers, the main banking education professional body in England and Wales). Now a University College in its own right, the *ifs* has a number of degree programmes and gives space to some academic research. Interestingly, my studies at the Charles Babbage Institute and at LSE are directly relevant to this position, as I am often teaching and researching on both the organisational strategy and technology matters in banks. Having studied the performance of concentrically diversified electrical and electronics enterprises in the computer sector, I have found that banks, especially those adopting a universal or bancassurance model, suffer some of the same problems.

I have a number of projects underway with academics at the University of Kent on the use of price comparison services in banking. I am also working with researchers at the University of Southampton on the UK electronics industry. However, my primary goal is to bring together my banking and computer history interests and to focus on architectural change and software development in the banking sector. Having worked for banks during the migration from the mainframes coupled to dumb green screens to client-server architectures, and also having seen the migration towards packaged software solutions in

banking, I will be exploring how technologists in the banking industry and from the supplier industry made the case for significant investments in these new technologies. These studies will undoubtedly bring me back to the resources and the excellent research environment offered by the Charles Babbage Institute and will form a base for my research along with the archives of banks and a number of interviews with technology leaders at banks and suppliers. I cannot envisage undertaking such a project without the support of the Charles Babbage Institute whose support has been invaluable.

Dr Anthony Gandy
Reader - Postgraduate Programmes
ifs University College
tgandy@ifslearning.ac.uk
tpsgandy@btopenworld.com

Gandy, A. (2013). *The early computer industry: Limitation of scale and scope*. Palgrave MacMillan.
Gandy, A. (2013). "Product strategy choices – Honeywell and RCA mainframe computer product strategies 1963–71." *Business History.*

SHOT 2013

The Society for the History of Technology (SHOT) held its annual meeting this year in Portland, Maine. On the evening of Thursday, October 10th, the SHOT program kicked off with an opening plenary, "The Multiple Histories of Technologies." Friday and Saturday included a total of approximately 100 papers, as well as numerous presidential roundtable discussions on various historical and historiographical topics and themes. There were also a number of "Author Meets Critics" sessions, including one on Nil Disco and Eda Kranakis' impressive edited volume *Cosmopolitan Commons*. CBI director Thomas Misa was a panelist for this session.

MIT's Rosalind Williams was awarded the da Vinci Medal for her longtime contributions to the history of technology and to the Society. Her da Vinci Medal talk offered a historiographical framing drawing from past debates in SHOT as setup to discussion of her most recent book on late 19th century writers Jules Verne, William Morris, and Robert Louis Stevenson and their literary responses to technological, environmental, and political change. The regular program concluded late Saturday afternoon with a plenary session, "SHOT in a Changing Global Environment," chaired by incoming President Bruce Seely (Michigan Technological University).

Computer history was well represented at the regular SHOT meeting with nineteen papers, roughly one-fifth of the entire program. Many computer historians also took part in presidential roundtable sessions. The SHOT Special Interest Group for Computers, Information, and Society (SIGCIS) provided an additional sixteen papers on computer history.

A number of computer historians arrived early to take part in the *IEEE Annals of the History of Computing* editorial board meeting run by Editor-in-Chief Lars Heide. Heide was also on this year's three member program committee for SHOT, and will be chairing this committee for the 2014 SHOT meeting in Dearborn, Michigan.

SIGCIS Group. Photo courtesy of Tom Haigh.

On Friday, October 11, SIGCIS held its annual lunch, with new members introducing themselves and briefly relating their research interests. Travel award recipients collected their prizes, while the book auction raised funds for future support for graduate student travel to SHOT/SIGCIS. As usual, MIT Press was particularly generous in donating books for the auction. CBI senior research fellow Jim Cortada also donated a substantial number of his many titles published on the history of information technology.

William Aspray giving SIGCIS plenary address. Photo courtesy of Tom Haigh.

On Sunday, October 13, SIGCIS held its annual one-day workshop with the theme "Old Ideas: Recomputing the History of Information Technology." The workshop was organized by SIGCIS chair Thomas Haigh (University of Wisconsin, Milwaukee), who spoke on the workshop's theme in his introduction to the opening plenary address by William Aspray (University of Texas). Aspray provided an inspired and insightful historiographical talk entitled, "In Search of the Many Histories of Information." Aspray related different types of research questions characteristic of different subfields of information studies (including computer history, library history, archives history, information studies history, and book, reader, and print culture history), and the opportunities and challenges for interdisciplinary discourse, as well as for peer review.

The SIGCIS program offered talks that spanned time and space from the Jacquard loom and punch card industrial control in France and Britain and the Mahratta as the Victorian Internet in India to the history of computer graphics at the University of Utah and comparative analysis of U.S. and Russian computer science journals during the Cold War. Tomash fellow Joy Rankin (Yale University) provided a particularly insightful presentation examining early time-sharing and educational computing networks in the state of Minnesota. CBI associate director Jeffrey Yost chaired the closing plenary

session “An Ancient Continent as a New Frontier,” on computing history in Asia. Following this session, many SIGCIS members convened for a dinner at a nearby Spanish restaurant.

Andrew Russell awarding Joy Rankin SIGCIS grant. Photo courtesy of Tom Haigh.

University of South Carolina assistant professor Joseph November’s book *Biomedical Computing: Digitizing Life in the United States* received the 2013 Computer History Museum-sponsored SIGCIS Book Prize for the best book published over the past three years on the history of computing. This is a highly insightful analysis of the hitherto ignored topic of the history of medical computing. As Rice University’s Cyrus Mody wrote in the *Journal of American History*, “…in this finely drawn, much-needed study, November shows how a few visionary physicians, life scientists, and computer specialists first created common cause and transformed their respective fields.”

Computer history was also represented in a wider SHOT prize. Following on past Tomash fellow Eden Medina’s winning of last year’s Edelstein Prize for her book *Cybernetic Revolutionaries* (2011), Christophe Lécuyer and David Brock’s edited volume *Makers of the Microchip: A Documentary History of Fairchild Semiconductor* (MIT 2010) won the 2013 SHOT Ferguson Prize for “outstanding and original reference work that will support future scholarship in the history of technology.”

Past Tomash fellow Thomas Haigh has led SIGCIS for eight years. SIGCIS has seen remarkable growth in membership and activities under his tenure. In addition to Haigh’s intellectual leadership, which has been evident at each of the SIGCIS Sunday workshops, Haigh has also provided permanent infrastructure for a book prize (through fundraising an endowment) and to fund graduate student travel to participate in SHOT and SIGCIS (through the Michael S. Mahoney Memorial Fund and the annual book auction). He also led the effort to build an online infrastructure—with a rich site containing member

profiles, an IT history syllabus library, and other resources. Each of the past eight years, Haigh helped organize regular sessions on computing history at SHOT in addition to either leading or assisting with the SIGCIS program. He has also worked to put together computer history sessions at the Business History Conference and 4S. We all owe a great debt to Tom for his distinguished service to SIGCIS and to SHOT. Past CBI Tomash fellow Andrew Russell, a highly talented scholar and administrator, will take over as SIGCIS chair—ensuring the organization will continue to grow and thrive.

Tom Haigh SHOT 2012

Computer history within SHOT's general program:
Meryl Alper (University of Southern California) "'Can Our Kids Hack It With Computers?': Making Hacking 'Family-Friendly,' 1983–1987," David Brock (Chemical Heritage Foundation) "Oil Exploration, Automation, and Bits: Pasadena Chemical Instrumentation Firms and the Electronic Computer Industry in the 1950s," Peter Sachs Collopy (University of Pennsylvania) "Digitizing Video: Synthesis, Computerization, and Experimental Art," Deborah Douglas (MIT Museum) "Countless Connecting Threads: New Insights from MIT's Material Culture," Helena Durnova (Masaryk University) "Did Gender Not Matter? Lives of Prominent Female Programmers in Czechoslovakia," Nathan Ensmenger (Indiana University) "Toward an Environmental History of Computing," Jacob Gaboury (New York University) "Image Objects: Early Experiments in 3D Computer Graphics," Raiford Guins (Stony Brook University) "Design and Designation: The History of a Curious Appellation for an Analog Computer Tennis Simulation (Or, How Brookhaven National Laboratory's Tennis Programming No. EH1–900–1-3 aka *Tennis for Two* Got Its Name)," Thomas Haigh (University of Wisconsin, Milwaukee) "Actually, Turing Didn't Invent the Computer," David Hemmendinger (Union College) "COMIC: An Analog Computer in the Colorant Industry," Marie Hicks (Illinois Institute of Technology) "The Invisible Logic of Technocracy: Feminization, Reskilling, and Governance in British Computing, 1944–1979," Chuck House (InnovaScapes Institute) "Digitizing Measurements: A Difficult Transition for Instrument Companies?", Chigusa Kita (Kansai University) "Governmental Role, Universities, and Users' Demand for Scientific Computing in Japan, 1963–1970," Katherine McFadden

(University of South Carolina) “From Cars to Cars: Industry Innovation in Computer Graphics,” Irina Nikiforova (Higher School of Economics) “Evaluating Technical Contributions in Computing: Peer Review and the Challenges Faced by ACM Scientists and Engineers,” Laine Nooney (Stony Brook University) “Competition or Camaraderie? A Cultural History of the Early 1980s West Coast Microcomputer Game Software Industry,” Rebecca Onion (Philadelphia Area Center for History of Science) “Playing the Environment: Advocacy and Web-Based Video Games in Contemporary American Children’s Culture,” Andrea Sartori (University of Florence) “Histories of Digitization: A Multiple Narrative Approach to Technological Innovation in Cultural Heritage,” Peter Schaefer (Marymount Manhattan College) “Inventing Network Neutrality, 1973–1985,” Corinna Schlombs (Rochester Institute of Technology) “Built on the Hands of Women: Office Automation and Women’s Work.”

Papers at SIGCIS included Janet Abbate “Old Disciplines and New Infrastructures: Constructing Computer Science in the 1960s,” Ross Bassett “Rethinking the Victorian Internet: The Mahratta and the Rise of Technological Nationalism in Poona, India, 1881-1901,” Julie Cohn “‘The Old was Analog, The New was Digital’: Transitions from the Analog to the Digital Domain in Electric Power Systems,” Jacob Gaboury “Image Objects: Computer Graphics at the University of Utah,” Barbara Hahn “Punch Cards and Industrial Control: Old Devices with New Relevance,” Mary E. Hopper “Wisdom from Athena: A Paradigm for Precognition,” Christopher Leslie “A Missing Link: Placing International Teleprinter Networks into the Prehistory of the Internet,” Ling-Fei Lin “The Origins of Laptop Contract Manufacturing in Taiwan and the Transnational Learning Years, 1988-2001,” Pierre Mounier-Kuhn “ ‘Une Science Encore Incertaine’: The Emergence of Computer Science in France (1955-2000),” Irina Nikiforova “Competing Visions of New Science: Computer Science Journals in the US and Russia, 1945-1970,” Joy Rankin “The Time-Sharing Movement: Building Educational Computing Networks in Minnesota 1965-75,” Ramesh Subramanian “Old Ideas: BBSs and the Emergence of Online Communities in India.”

Jeffrey R. Yost

Recent Publications

Allen-Robertson, James. *Digital Culture Industry: A History of Digital Distribution* (Palgrave, 2013).

Bennett, Rick. "Oracle Marketing: Killer Ads." *IEEE Annals of the History of Computing* 35:2 (Apr.-Jun. 2013): 24-30.

Bohl, Marilyn. "Product Managing DB2's Early Development." *IEEE Annals of the History of Computing* 35:2 (Apr.-Jun. 2013): 67-68.

Brock, David C. "From Automation to Silicon Valley: The Automation Movement of the 1950s, Arnold Beckman, and William Shockley." *History and Technology* 28:4 (2012): 375-401.

Brunton, Finn. *Spam: A Shadow History of the Internet* (MIT Press, 2013).

Campbell, Scott. "'Wat For Ever:' Student-Oriented Computing at the University of Waterloo." *IEEE Annals of the History of Computing* 35:1 (Jan.-Mar. 2013): 11-22.

Campbell-Kelly, Martin, William Aspray, Nathan Ensmenger, and Jeffrey R. Yost. *Computer: A History of the Information Machine, Third Edition* (Westview Press, 2014).

Dennis, Michael A. "Scientific and Technological Knowledge and the Making of Political Order." *History and Technology* 28:4 (2012): 415-421.

Dick, Stephanie. "Machines Who Write." *IEEE Annals of the History of Computing* 35:2 (Apr.-Jun. 2013): 85-88.

Ensmenger, Nathan. "Computation, Materiality, and the Global Environment." *IEEE Annals of the History of Computing* 35:3 (Jul.-Sept. 2013): 78-80.

Epstein, Bob. "History of Sybase." *IEEE Annals of the History of Computing* 35:2 (Apr.-Jun. 2013): 31-41.

Fevolden, Arne Martin. "The Best of Both Worlds? A History of Time-Shared Microcomputers, 1977-1983." *IEEE Annals of the History of Computing* 35:1 (Jan.-Mar. 2013): 23-34.

García-Sancho, Miguel. *Biology, Computing, and the History of Molecular Sequencing: From Proteins to DNA, 1945–2000* (Palgrave Macmillan, 2012).

Gobbo, Federico and Marco Benini. "From Ancient to Modern Computing: A History of Information Hiding." *IEEE Annals of the History of Computing* 35:3 (Jul.-Sept. 2013): 33-39.

Grad, Burton. "Relational Database Management Systems: The Business Explosion." *IEEE Annals of the History of Computing* 35:2 (Apr.-Jun. 2013): 8-9.

Green, Mike. “Dummer’s Vision of Solid Circuits at the UK Royal Radar Establishment.” *IEEE Annals of the History of Computing* 35:1 (Jan.-Mar. 2013): 56-66.

Haderle, Donald J. and Cynthia M. Saracco. “The History and Growth of IBM’s DB2.” *IEEE Annals of the History of Computing* 35:2 (Apr.-Jun. 2013): 54-66.

Hartley, David. “CPL: Failed Venture or Noble Ancestor?” *IEEE Annals of the History of Computing* 35:3 (Jul.-Sept. 2013): 55-63.

Hicks, Marie. “De-Brogramming the History of Computing.” *IEEE Annals of the History of Computing* 35:1 (Jan.-Mar. 2013): 86-88.

Jesiek, Brent K. “The Origins and Early History of Computer Engineering in the United States.” *IEEE Annals of the History of Computing* 35:3 (Jul.-Sept. 2013): 6-18.

Kavita, Philip, Lilly Arani, and Paul Dourish. “Postcolonial Computing: A Tactical Survey.” *Science, Technology, and Human Values* 37:1 (2012): 3-29.

Kline, Ronald. “Beyond the Closed World.” *History and Technology* 28:4 (2012): 407-413.

Knuth, Donald and Edgar G. Daylight. *The Essential Knuth* (Lonely Scholar 2013).

Lathrop, Jay W. “The Diamond Ordnance Fuze Laboratory’s Photolithographic Approach to Microciruits.” *IEEE Annals of the History of Computing* 35:1 (Jan.-Mar. 2013): 48-55.

Medina, Eden. “Author Response.” [forum on her book *Cybernetic Revolutionaries*—response to short articles by R. Kline, M.A. Dennis, and T. Saraiva] *History and Technology* 28:4 (2012): 431-441.

Mendelsohn, Andrew. “The Oracle Story: 1984-2001.” *IEEE Annals of the History of Computing* 35:2 (Apr.-Jun. 2013): 10-23.

Misa, Thomas J. *Digital State: The Story of Minnesota’s Computing Industry* (University of Minnesota Press, 2013).

Monnier, Valéry, Walter Szrek, and Janusz Zalewski. “Chaim Selig Slonimski and His Adding Devices.” *IEEE Annals of the History of Computing* 35:3 (Jul.-Sept. 2013): 42-53.

Sandström, Christian. “Facit and the Displacement of Mechanical Calculators.” *IEEE Annals of the History of Computing* 35:3 (Jul.-Sept. 2013): 20-31.

Saraiva, Tiago. “The History of Cybernetics in McOndo.” *History and Technology* 28:4 (2012): 423-430.

Sippl, Roger. “Informix: Information Management on Unix.” *IEEE Annals of the History of Computing* 35:2 (Apr.-Jun. 2013): 42-53.

Sito, Tom. *Moving Innovation: A History of Computer Animation* (MIT Press, 2013).
Tatnall, Arthur. “The Australian Educational Computer That Never Was.” *IEEE Annals of the History of Computing* 35:1 (Jan.-Mar. 2013): 35-47.

Van Dijck, Jose. *The Culture of Connectivity: A Critical History of Social Media* (Oxford University Press, 2013).

Yood, Charles. *Hybrid Zone: Computers and Science at Argonne National Laboratory, 1946-1992* (Docent Press, 2013).

Yost, Jeffrey R. “Computer Industry Pioneer: Erwin Tomash (1921-2012).” *IEEE Annals of the History of Computing* 35:2 (Apr.-Jun. 2013): 4-7.

Compiled by Jeffrey R. Yost

Featured Photo

ILLIAC-IV, constructed by Burroughs in Paoli, Pennsylvania, was an unusual parallel processing supercomputer. Intended for the University of Illinois, it was instead moved to NASA's Ames Research Center in Mountain View, California. "The computer can process up to 200 million instructions per second, which is equivalent to processing the names of New York's 8 million people 25 times every second," according to publicity about the move in September 1972. The controversy surrounding ILLIAC IV at Illinois is described by John Day in his CBI oral history.