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CBI Annual Report

July 1, 2005 to June 30, 2006

Introduction

This fiscal year marks a twenty-six year affiliation of the Charles Babbage Institute (CBI) with the University of Minnesota. After two years in an organizational phase, CBI accepted an invitation of the University of Minnesota to become a research unit of the University. Over the last quarter century, CBI has had strong support from the Institute of Technology and from the University Libraries, as well as, guidance and financial support from the Charles Babbage Foundation. Many other individuals and corporations helped with gifts over the years. The greatest tribute to this support is the many products produced by and collections assembled at and service offered by CBI. Publications, oral history recordings/transcripts, records collections, photographs, and videos are CBI's resource available to all. And CBI staff provides research assistance to scholars throughout the world; college, high school, and elementary school students and teachers; companies; publishers; journalists; patent attorneys; hobbyists; and others. The CBI/Tomash Fellowship aided many young scholars to gain a foothold in the history of computing, and their contributions are an indirect effect of CBI's efforts. We now enter a new period of leadership, and this year has been something of a transition.

Beginning in September 2005, Arthur Norberg reduced his hours with the University to 60 percent of what they were in the past devoted exclusively to CBI. His service ends in June 2006, when Thomas Misa assumes the directorship and the ERA Land-Grant Chair in History of Technology. Misa and Norberg have been working together since January 1, 2006, to accomplish a smooth transition from one director to the next. Several meetings were held with donors to CBI and the University to introduce Misa and to discuss his plans and the reactions to the plans by CBI's advisors and sponsors. Norberg officially retires on June 9, 2006. Resources will continue to be aggressively collected and new areas of research will become a strong component of the new leadership.

Historical and Archival Research

IBM Rochester History Research Project

IBM Rochester is planning a celebration of its 50th anniversary to occur in July 2006. As part of this celebration, CBI participated with a group of IBM employees, led by Ms. Valerie H. Pace, State Manager for Community Relations, to prepare a history of IBM Rochester that tells the story of its activities and accomplishments, entitled *IBM Rochester: A Half Century of Innovation*. The study, prepared by Arthur Norberg and Jeffrey Yost, details the many innovations at the Rochester facility beginning with those in the unit record punch card systems of the 1950s and 1960s and moving through the various System/3x computer systems of the 1960s and 1970s to the AS/400 in the late 1980s, one of IBM's most significant contributions to mid-range computer systems. Sources for the text came from IBM Rochester's archival holdings, the IBM Corporate Archives, CBI collections, and the published literature, as well as from more than a dozen interviews with IBM Rochester employees past and present conducted by Yost and Norberg. IBM will print the history as a booklet, which will be widely distributed both inside and outside IBM. For an overview of

IBM Rochester's history, see an article in the *CBI Newsletter*
<http://www.cbi.umn.edu/newsletter/article2.html>.

History of the U.S. computer services industry

At the end of last fiscal year, Jeffrey Yost began work on a new book project on the history of the U.S. computer services industry from the mid-1950s to the present. This study will begin with an examination of the organizational capabilities of some leading U.S. office machine companies during the pre-digital period (IBM, Burroughs, and Remington Rand) in order to gain perspective on how firm and industry level skills, knowledge, and resources transferred to the digital computer services area after World War II. The study will document and analyze the growth and rapid change in the computer services industry during the 1950s and 1960s, (including the pioneering digital computer service firms and service divisions/operations of mainframe manufacturers); the subsequent success of focused providers that took the trade to new heights; the role played by industry trade organizations, the broadening of services in both scale and scope; and co-existence of industry giants and small-scale firms in the era of ubiquitous computer networking. Yost is analyzing these trends within the context of the growing globalization of the trade in recent years and the rapid acceleration of "offshoring" to India and other developing countries. Yost published an overview essay of this history, and related methodological issues for its study, in an article that appeared at the end of 2005 in the French publication *Enterprises et Histoire* (see publications below).

Archival Research: Internet2 Project

Work on the 21-month "Documenting Internet2" project concluded in November 2005. Sponsored by the National Historical Publications and Records Commission, a division of the National Archives, the project was intended to develop feasible methods for selection, description, and long term preservation of historically significant born-digital records in the subject area of history of information technology. The primary goal of CBI's Internet2 Project has been to lay the groundwork for implementation of a sustainable electronic records program at the Charles Babbage Institute, consistent with CBI's collecting scope and with professional archival and technological standards. CBI's partners in the project were the University of Minnesota Libraries, the University of Michigan School of Information, and Internet2.

In the last annual report, we summarized the lessons learned in this project and listed the outcomes of the project. A summary of those findings is available in "Internet2 Project: 21-month Report" *CBI Newsletter* 27:2 (Fall 2005). Project work unfolded in three phases: gathering information and immersion in the recordkeeping culture of Internet2; developing a set of detailed appraisal options, specific to this context; and conducting a series of pilot projects to test these appraisal options. The pilots were a "web crawl" of the Internet2 web site to test this as a method of capturing content, an examination of Internet2's on-line Document Library to explore submission to this library as a means to access/acquire/appraise valuable records, and an analysis of the array of PowerPoint presentations files of Internet2.

Early on, the project staff began to shy away from the initial proposal to produce "guidelines" for other institutions, as they discovered just how true is the adage that no one size fits all. There is no real one size that fits all solutions for documenting contemporary activities in the paper world. In the digital realm, in contrast to the paper realm where archivists are comfortable with the array of options for appraisal, the archival community is not yet to the

point where the level of skills, knowledge, and comfort is enough to propel archivists to rely on their own judgment. Archivists need to be flexible and plan projects in the new realm accordingly. Documenting active organizations means defining relationships for the future. Archivists need to think strategically about how to make the most of these connections. The full report can be found on the CBI web site at <http://www.cbi.umn.edu/documentinginternet2/documents/finalreport.pdf> .

CBI will continue to explore the results of this project, will try to establish the collaborations that can produce greater knowledge of assessing digital records and obtaining collections for research, and will work cooperatively with other groups devoting effort to digital records of organizations, especially with the new University Libraries University Digital Conservancy Program.

Oral Histories Conducted During FY 2005

Conducted by Arthur Norberg:
David L. Schleicher

Conducted by Jeffrey Yost:
Werner Frank
Gideon Gartner
Thomas Paske

CBI/Tomash Fellow

Andrew Russell, Johns Hopkins University, 2006-2007 Tomash Fellow

Andrew Russell was recently named the 2006-2007 Tomash Fellow. Russell's dissertation project titled, "Innovation by Consensus: The Politics of Standards in the Information Industries," is focused on standards developed through collaborative processes in technical committees and trade associations that become consensus or "open" standards. His dissertation will examine the development of consensus standards from professional engineering societies in the early twentieth century to industry consortia at the turn of the twenty-first century. He plans to give particular attention to the politics of standard setting in struggles to establish authority and legitimacy in computer networking and internetworking, and telecommunications.

Archives Activities

ACM Records Survey

In December 2005, at the request of the ACM History Committee, Elisabeth Kaplan and Carrie Seib conducted a records survey at the ACM headquarters building in New York. The premise for conducting this survey was an assumption that a body of valuable historical documentation existed at ACM, which could be mined for the core of an historical archives. Kaplan and Seib conducted preliminary research, spent a week on-site interviewing staff and surveying paper records, and produced a report for the committee. Among the questions to be answered were these: had anything approaching a critical mass of important archival documentation survived the organization's first 60 years? If so, where is it located: Is it physically safe? Is it under any kind of intellectual control? Can it be made available to researchers? And, how is current ACM documentation being created, shared, and preserved? The assessment of the current state of ACM documentation was the first part of the planning

project; the second was a set of recommendations for future action based on these findings. Among the results was the discovery of eighty-six feet of valuable archival records. Ten recommendations were made to the ACM History Committee for the handling, organization, and storing of records held by ACM, along with a call to acquire additional records that fill in gaps in the existing collection. An additional feature of this study was the search for materials in other archives to complement the ACM holdings. Most of these materials are in the collections of CBI.

Web Site Redesign Underway

In January 2006, archives staff began preliminary work on a redesign of the CBI web site, intended to bring the site's look and feel in line with new University of Minnesota standards. Work will continue over the next several months, with the input and assistance of all CBI staff.

New/Additions to Archival Collections

CBI acquired additions to several collections in the past year, including:

- Twin Cities Osborne Group Records
- Ralph E. and Madge T. Griswold Papers
- M. Eugene Cook Papers
- Jerome Garfunkel Papers
- Control Data Corporation Records, Product Literature and Product Manuals
- Burroughs Corporation Records, Robert G. Busse Scrapbook
- Burroughs Corporation Records, Burroughs Compilogram
- Computer Product Manuals Collection (ML/I program documentation)
- DPMA – Northwest Chapter Records

CBI also received donations of print publications this past year, which were added to CBI's serials and reference collections. They include a number of books from Erwin Tomash's private reference collection as well as the *Research in Word Processing Newsletter* (1983-1989). We are as always grateful to all of the individuals and organizations whose contributions strengthen the CBI collections.

Finding Aids

Many new and updated finding aids are available on the CBI web site as a result of descriptive work completed this year.

New:

Donn B. Parker Papers (CBI 166) <http://www.cbi.umn.edu/collections/inv/cbi0166.html>

CURTA Literature (CBI 180) <http://www.cbi.umn.edu/collections/inv/cbi00180.html>

Control Data Corporation Records (CBI 80)

- Engineering, Research and Development (Series 7)

- <http://www.cbi.umn.edu/collections/inv/cdc/cbi00080-07.html>

- Marketing, Sales and Public Relations (Series 12)

- <http://www.cbi.umn.edu/collections/inv/cdc/cbi00080-12.html>

- Research and Development Project Reports (Series 25)

- <http://www.cbi.umn.edu/collections/inv/cdc/cbi00080-25.html>

Burroughs Corporation Records (CBI 90)

- General Subject File (Series 108)

- <http://www.cbi.umn.edu/collections/inv/burros/cbi00090-108.html>

Robert G. Busse Scrapbook (Series 109)

<http://www.cbi.umn.edu/collections/inv/burros/cbi00090-109.html>

Updated:

Control Data Corporation Records (CBI 80)

Executive Papers (Series 8)

<http://www.cbi.umn.edu/collections/inv/cdc/cbi00080-08.html>

Facilities (Series 21)

<http://www.cbi.umn.edu/collections/inv/cdc/cbi00080-21.html>

Personnel Documents and Reports (Series 15)

<http://www.cbi.umn.edu/collections/inv/cdc/cbi00080-15.html>

Serial Publications (Series 19)

<http://www.cbi.umn.edu/collections/inv/cdc/cbi00080-19.html>

Burroughs Corporation Records (CBI 90)

ElectroData Division Photograph Collection (Series 35)

<http://www.cbi.umn.edu/collections/inv/burros/cbi00090-035.html>

Product Literature (Series 74)

<http://www.cbi.umn.edu/collections/inv/burros/cbi00090-074.html>

American Federation of Information Processing Society (AFIPS) Records (CBI 44)

<http://www.cbi.umn.edu/collections/inv/cbi00044.html>

Twin Cities Osborne Group Records (CBI 119)

<http://www.cbi.umn.edu/collections/inv/cbi00119.html>

Edmund C. Berkeley Papers (CBI 150)

<http://www.cbi.umn.edu/collections/inv/cbi00050.html>

Reference Statistics

The volume of research continues apace. Some sample statistics:

Patrons served (July 2005-April 2006)

232 individuals (personal contacts)

742 transactions

1769 oral history downloads

729 boxes retrieved

11652 photocopies made

Research Visitor Highlights (selected)

Society for the History of Technology/History of Science Society Conference

Both the joint Society for the History of Technology (SHOT)/History of Science Society (HSS) conference and the *IEEE Annals* board meeting were held in Minneapolis in early November 2005. Many attending these events took advantage of the opportunity to visit CBI, tour the facilities, and conduct research using the CBI archival collections. Archives staff spent many hours assisting the more than a dozen visiting researchers, including retrieving over 150 requested boxes and making nearly 3,500 photocopies.

Tomash Fellow

Tomash fellow and doctoral candidate in the Program in the History of Science and Technology at the University of Minnesota, Ron Frazzini, spent time in the CBI archives in

January 2005 conducting research in the Burroughs Corporation Records for his dissertation on the Italian informatics firm Olivetti S.P.A. (See related article on Frazzini's dissertation).

Publishers/Media

The archives provided research assistance and materials for use in publication to international, national and regional publishers and media outlets including MIT Press, Cambridge University Press, *IEEE Annals of the History of Computing*, Cherbo Publishing (Minnesota), and *Twin Cities Public Television*.

Exhibits

The archives provided Northwestern Aeronautical Corporation images and contributed research assistance for a traveling exhibit entitled "Wisconsin Plywood Industry's Contribution to WWII." The exhibit, created by the Camp 5 Museum in Laona, Wisconsin, will be shown at the annual meeting of the Forest History Association of Wisconsin in Laona before beginning a tour of cities nationwide.

The archives provided assistance with image research for a new exhibit entitled, "The Microcomputer Gallery," at the New Mexico Museum of Natural History and Science in Albuquerque. The exhibit is a collaborative project of Paul Allen, the New Mexico Museum of Natural History and Science, and the New Mexico Department of Cultural Affairs.

Oral Histories Published (added to online database) During FY 2006

Paul Strassman OH 131, OH 172
Richard Hedger OH 378

Fourteen oral histories were conducted at a meeting on the history of personal computer software, held by the Software History Center in May 2004. Eight of these were added to the CBI oral history database. The rest will be added as transcription work is completed.

Ben Dyer OH 382
Gary Harpst OH 383
John Imlay OH 384
Luanne Johnson OH 385
John Landry OH 386
Mike Maples OH 387
Jonathan Sachs OH 388
Oscar Schachter OH 389

Archives Staff News

This has been a year of transition for CBI archives staff. In September 2005, Archivist Beth Kaplan left CBI to become University Archivist and Co-Director of the University of Minnesota Libraries' Digital Conservancy. Beth came to the CBI archives in 1999, and was CBI's second professional archivist (Bruce Bruemmer served in that position from 1984-1997).

Carrie Seib, former Assistant Archivist, has served as Acting Archivist since Beth Kaplan's departure and will continue to do so until the end of June 2006, when she will leave CBI to prepare for a move to Fargo, North Dakota.

A national search for a new CBI Archivist is underway. Please see the position posting on the University of Minnesota website at:

<http://www1.umn.edu/ohr/employment/openings/job136311.html>. The position also will be advertised in professional publications and web sites including the *Archival Outlook*, a publication of the Society of American Archivists (SAA); the SAA web site; the Archives & Archivists Listserv; and the CBI web site.

Karen Spilman joined the staff as Project Archivist in late November 2005. Karen has an M.L.I.S. (Library and Information Science) with a focus in archival management from Dominican University/College of St. Catherine. She has worked in various capacities in the University of Minnesota Libraries' Department of Archives and Special Collections, most recently on the department's EAD Implementation Project. She has also worked for the Minnesota Historical Society, and is a member of the Society of American Archivists and the Midwest Archives Conference.

This year we welcomed three new efficient and capable student assistants. Kevin Irving started in September 2005; Jessica Huffman started in March 2006; Sasha Grossman started in April 2006.

Publications

Kaplan, E., "Documenting Internet2: A Collaborative Model for Developing Electronic Records Capacities in the Small-scale Repository Setting. Final Report." Charles Babbage Institute, 10 March 2006.

Yost, J. R., "Maximization and Marginalization: An Examination of the History and Historiography of the U. S. Computer Services Industry." *Enterprises et Histoire*, November 2005, No. 40: 87-101.

Presentations, professional service, conferences attended:

Kaplan, E.

"Documenting Internet2: Challenges and Opportunities in Documenting High-Technology." Il Encontro de Arquivos Científicos, Rio de Janeiro, Brazil, September 2005.

"Documenting Internet2: A Grant Report." Libraries Issues Seminar, University of Minnesota Libraries, March 2006. (with C. Seib and Eric Celeste)

Society of American Archivists Annual Meeting, New Orleans, August 2005
Co-chair, 2005 program committee

Seib, C. A.

"Documenting Internet2: Report to the Profession." Society of American Archivists Annual Meeting, New Orleans, August 2005 (with E. Kaplan)

"Documenting Internet2: A Grant Report." Libraries Issues Seminar, University of Minnesota Libraries, March 2006. (with E. Kaplan and Eric Celeste)

Member, EAD Implementation Technical Group, University of Minnesota Libraries

Spilman, K.

Coordinator, EAD coding project, University of Minnesota Libraries.

Yost, J. R.

Society for the History of Technology (SHOT), Annual Meeting
Special Interest Group on Computing meeting

Business History Conference, Annual Meeting

“A Brief Historical Examination of Business Strategy and Innovation in the
Computers Services Industry.” Computer Science Department, University of
Minnesota, Colloquium Series, April 2006

Editorial Board, *IEEE Annals of the History of Computing*

Article Editor, *IEEE Annals of the History of Computing*

International Federation of Information Processing Societies (IFIPS), Working Group
on the History of Computing

Fact-finding trip to India to visit IT companies.

Computer History Museum, History of Professional Services Workshop, February
2006 Charles Babbage Foundation/Computer History Museum Corporate
Histories Project Advisory Meeting

The IBM Rochester Study

IBM Rochester celebrates its 50th anniversary this year. In 1956, after an extensive search, IBM announced that it would build a manufacturing plant on the outskirts of Rochester, MN. In typical IBM style, the company moved fast to initiate manufacturing. A general manager was named in March; the company arranged for short-term rental space in June; and the local business organization built a temporary building that IBM occupied in August 1956. Only a few days later, the first two machines left the plant for customers' sites. Shortly thereafter, IBM engaged Eero Sarinen Associates to design and build the first segment of buildings of what would become a fully integrated facility. Two years later, most of the activity was enclosed in the new buildings and an open house occurred to dedicate the facility.

At first, IBM Rochester manufactured unit record machines designed at another IBM facility. The first two machines were the 077 Numeric Collator and 089 Alphabetic Collator, both designed in the second half of the 1930s. Refinements to these machines resulted in their being withdrawn from manufacturing in favor of two new designs: the 085 and the 087. IBM manufactured an array of other machines at Rochester in the early years as well, high-speed punches, sorters, card readers, bank proof machines, alphabetic interpreters, unit inscribers, and reader-punches. Engineers in manufacturing explored ways to produce these machines faster and at lower cost. As a result, many innovations came in manufacturing.

An early indicator of IBM Rochester's growing importance to IBM was the establishment of a Development Laboratory in June 1961. Henceforth, IBM Rochester would design and manufacture systems based on its own designs. The first unit record machine designed by IBM Rochester was the 188 solid-state Collator, which replaced the earlier IBM collator in the market. Over the following ten years, IBM Rochester made many improvements in processes for manufacturing machines, assumed responsibility for the manufacture of yet more designs of other IBM units, and, in its signal achievement of the 1960s, the Rochester staff designed IBM's first small and medium size computer system for businesses just entering the computer age. The System/3, as it was called, was an immediate success. The System/3 was a cross between a punch card system plus calculator and a computer with various types of storage, including punch cards. The System/3 allowed a small business to retain its reliance on punch cards and achieve added computing capability at an affordable price.

From the System/3 in 1969, IBM Rochester went on over the next 15 years to design several follow-on computer systems with increased capability, memory, and functionality. These were the System/32 (1975), System/34 (1977), System 36 (1983), and the System/38 (1978) families of machines. System/36 and System/38 are the most interesting of this set. The System/38 was a general purpose data processing system designed to provide a high level of function, ease of use, reliability, serviceability, and non-disruptive growth. It supported advanced database and interactive workstation applications as well as traditional batch applications. These extensive capabilities were made possible by the use of novel architecture and design concepts, advanced technologies, and new implementation of system components, both hardware and software. The System/36 combined data processing, word processing, business color graphics and office management functions in a low-cost computer system. It operated as a stand-alone computer or in a network communicating with other System/36s or with larger IBM computers. When engineers at IBM Rochester tried to integrate these two

systems into a more powerful one (the AS/400), they found that there were many compatible elements making the integration work well.

By this time, IBM had several families of machines that overlapped, which began to cause concern that divisions were competing with each other in the same marketplace. Discussions were held to consider this turn of events and suggestions were made that units try to reduce the number of offerings by increasing the capability of new systems and reducing their cost. At Rochester, scientists and engineers investigated whether the System/36 and the System/38 could be combined into one system. A trend in design had been taking place that brought manufacturing into the project earlier and earlier. While management of the Silverlake project charged with this combination and design of a new computer system organized to increase the amount of interaction between designers and manufacturers, they also promoted a new innovation: involvement of users in the design and development process. The combination of System/36 and System/38 in one machine was not only successful, but a new computer system emerged from this activity in 1988: the AS/400. The original AS/400, and the many models of this design that followed, was a new general purpose, mid-range generation of computer system, designed for small and intermediate-sized companies and organizations, or distributed locations of large corporations. It was designed and built to combine the strengths of its predecessors. This included the System/36's large application portfolio and wide range of connectivity options, and the System/38's programmer productivity, advanced architecture, and integrated data base. Significant new functions were added to enhance ease of use and connectivity and to support IBM's Systems Application Architecture (SAA), on-line education, and direct electronic customer-to-IBM support. Hardware and software were designed in layers. Programmers developed a horizontal microcode layer and a vertical microcode layer and an operating system layer on top of that with applications, languages, and tools on top of that. Many of these innovations were patented by IBM.

Today IBM Rochester is part of a corporate-wide program to bring IBM's technological capability to potential customers and combine IBM's knowledge and technology with the customer's to produce solutions to old and new problems together. Thus, IBM Rochester has gone from simply a manufacturing plant to designing and producing complete computer systems to partnership in the global services business of IBM.

Jeffrey Yost and Arthur Norberg prepared a history of IBM Rochester, which will be published by IBM Rochester in June. In addition, IBM Rochester engaged Blue Planet, an exhibit company in Rochester, MN, to develop an exhibit for display in the facility. Meanwhile, others groups in IBM Rochester are preparing smaller exhibits on important historical areas of design and manufacturing at Rochester.

Arthur L. Norberg

Andrew Russell Named the 2006-2007 Tomash Fellow

Andrew Russell has been named the 2006-2007 Adelle and Erwin Tomash Fellow. Russell's dissertation is tentatively titled "Innovation by Consensus: The Politics of Standards in the Information Industries." He is particularly interested in standards developed through collaborative processes in technical committees and trade associations that become consensus or "open" standards. His dissertation will analyze the development of consensus standards from professional engineering societies in the early twentieth century to industry consortia at the turn of the twenty-first century—giving particular attention to the politics of standard setting in struggles to establish authority and legitimacy. Among the topics Russell is investigating are the limits of monopoly and government control in the telecommunications industry, and the influence of academic and military values on standards for computer networking and internetworking. He plans to use a number of CBI collections as part of his research.

Russell's interdisciplinary approach to the history of information technology first took shape while working at the Harvard Information Infrastructure Project in Harvard University's John F. Kennedy School of Government in 1997. He organized a number of seminars and conferences where a wide variety of academics, regulators, and industry professionals came to discuss political, economic, and legal aspects of the Internet. In 1999, he left Harvard for graduate school in history at the University of Colorado at Boulder. After completing his M.A. in 2003, he enrolled at the Department of the History of Science and Technology at Johns Hopkins University to work towards a doctorate, and has now advanced to candidacy. He has presented papers at a variety of scholarly conferences (including the Society for the History of Technology and the Society for the History of American Foreign Relations) and has several scholarly publications. This includes a forthcoming article " 'Rough Consensus and Running Code' and the Internet-OSI Standards War" in *IEEE Annals of the History of Computing*.

CBI is grateful to the generous support of CBI founders Erwin and Adelle Tomash, which makes this fellowship possible.

Jeffrey R. Yost

Research on Indian IT Industry and Offshoring Strategy

In January 2006, CBI Associate Director Jeffrey Yost traveled to India to take part in a two-week University of Minnesota Carlson School of Management program studying strategy and implementation of offshoring. One week was spent in Delhi and one week in Bangalore. In Delhi the group divided time between visits to companies to hear presentations from and meet with top executives of information technology firms, visits to leading Indian educational institutions (including the Indian Institute of Technology, IIT), and government visits to meet with top officials. In Bangalore, the sole focus was visiting multiple IT companies each day to meet with senior executives.

The government visits included meetings with secretaries and ministers of some of the major departments directly involved with policy development for information technology (Department of Commerce and Department of Telecommunications). It also included visits to departments involved with nationwide challenges India faces in trying to simultaneously continue and extend its rapid growth in information technology, maintain stability, and foster opportunities throughout Indian society (Department of Rural Development).

In addition to seeing what was being achieved by world class, highly competitive, educational institutions such as IIT, the group also examined the creation of the broader IT infrastructure within the country by technical schools such as NIIT. NIIT began as a technical trade school focused on information technology more than two decades ago. It has since grown substantially, and like similar schools, franchised itself to have locations and reach throughout much of India. Such schools have provided the technically trained labor force that has allowed India to rapidly expand enterprises engaged in computer programming, and other IT areas.

The group visited both Indian firms and U.S. multinationals that have set up operations in India. Initially the focus of both types of enterprises was focused on labor arbitrage. While this still plays a significant role, more and more firms are developing and taking advantage of the strong capabilities of the highly talented and versatile Indian workforce to develop innovative products and solutions and create and capture value from intellectual property development. Among the firms visited were Convergys, Wipro Technologies (corporate headquarters, main campus, and Wipro Global Radiation Services), Genpact (formerly a division of General Electric), Sapient, and Reuters.

Yost took advantage of this opportunity to travel and meet with business, government, and educational leaders to develop a broader understanding of changes occurring in India and how the talent pool of this nation, coupled with the growing modularity of value chains resulting from advances in computing technology, are impacting global IT industries. This topic is fundamental to elements of his ongoing research for a book on the history of the computer/software services industry—a project that spans the early development of the industry in the 1950s up to the present. Yost is grateful to the Carlson School and Carlson Professor Mani Subramani for the opportunity to participate.

The Development of Italian Informatics

Dr. Ronald M. Frazzini successfully defended his dissertation on May 1, 2006. The title of the dissertation is: “The Development of Italian Informatics: Technology Development of Olivetti Calculating Machines in the Global Business Machine Market.” Dr. Frazzini was the Tomash/CBI Fellow in 2004-2005.

Recent economic and political studies document and analyze the rapid growth of Italian industry and the national economy during the period immediately following World War II, the period of the Italian “Economic Miracle.” While much of this growth was arguably based on tariff protections, trade barriers and government control of locally based buy foreign owned assembly plants, rapid technological growth and its associated innovation played a major role. Technology innovation in Italy has been studied at a level that includes patent creation trends, the economic ramifications of management decisions regarding research and development, and effects of trade tariffs and other governmental policies. These studies, however, do little to explore actual product or machine development, historians, instead, have chosen primarily to consider the final impact of the completed device in a social or economic context. A “black box” consideration such as this does not analyze the origins of the device, but dwells on top-level, socially and culturally sensitive performance characteristics. While these studies are important to the ultimate social impact of device use, a look at the product in terms of an historical evaluation of the social and technological forces affecting detailed design for the device and its changes through subsequent years is also informative, particularly in the context of the post-war Italian industrial environment. Frazzini’s study is an analysis of the innovation within the design, development and production process for calculating instruments beginning with their design concept ideas and philosophy, to their production and marketing. The typewriter and calculating machine firm of Ing. C. Olivetti & C., S.p.A., of Ivrea, Italy, is used as the representative company and data source since it grew to a significant market level amidst competition from similar companies within the United States during a period immediately following the Second World War when Italy was struggling to recover from war damage.

In the study, Dr. Frazzini examined the conditions for and a model of innovation that includes the philosophies of Olivetti management toward design engineering freedom, the environment that existed to encourage or discourage that freedom, and the resources necessary to implement new and workable ideas. How one measures innovation is arguable at best. Economists have attempted to do so with data concerning the number of patents, and managers have listed the number of “new” ideas leading to new products, patentable or not. Each of these approaches minimizes many detailed ideas that were discussed and possibly tested as prototypes in a laboratory.

Recent historical studies of the evolution of the company, including several biographical studies, suggest that the particular managerial approaches utilized first by Camillo, and then Adriano Olivetti, were drivers for the company’s technical design methodology, and drove the resulting shape and functionality of the final machine configuration. Dr. Frazzini conducted an historical examination of the development of Olivetti’s calculating machine technology from its inception in 1928 of the team of technical designers and managers, to its production and marketing starting in 1939 to 1957, the effective date for production of electronic computing in Olivetti. Through consideration of the detailed design of early mechanical devices, Frazzini provides an up-to-now rare chapter in the story of industrial growth of the

period by the addition of these early Italian calculating devices. The study ends with an evaluation of innovation in the firm as compared to other firms such as Burroughs in the United States.

Frazzini plans to add some additional material to the text and publish the work as a monograph.

Arthur L. Norberg

CBI Archivist Position Posting

Program Description:

The University of Minnesota Libraries seeks visionary and creative leadership for the position of Archivist for the Charles Babbage Institute. The CBI archivist fosters collaborations within the University and actively seeks external partnerships to support and further the mission and activities of CBI, the Libraries, and the University. Key university collaborators include CBI historians, faculty in the History of Science and Technology graduate program and other relevant academic departments, Libraries colleagues (particularly in the Academic Programs and Information Technology Divisions). Key external partners include peer institutions, organizations and institutions in the private sector, and professional organizations. The Charles Babbage Institute (CBI) is an internationally recognized archives and research center dedicated to promoting the study and preservation of the history of information technology. Established at the University of Minnesota in 1980, CBI holds the world's premier collection of research material on computing after 1935. Collections include corporate records, personal papers, rare publications, photographs and moving image materials, technical publications, and extensive reference sources. CBI also holds a large collection of oral history interviews relating to the history of information technology. CBI and its archives are supported jointly by the University Libraries and the Institute of Technology. The CBI archival program reports to the Elmer L. Andersen Director of Archives and Special Collections, a department of the Libraries' Academic Programs Division, and is one of eleven archives and special collections units on the Twin Cities campus. CBI's mission statement is available at:

<http://www.cbi.umn.edu/about/mission.html> The University of Minnesota University Libraries are a vibrant system of 14 libraries on the Twin Cities campus with significant strength in archives and special collections. The University Libraries offer a highly collaborative environment, robust programs in digital collection and service integration, undergraduate and literacy initiatives, partnerships for research services, and a commitment to organization development. The Libraries' Digital Conservancy program, launched in 2005, is building infrastructure and campus partnerships to fulfill the Libraries' role as University Archives and to preserve born-digital information assets of the University community. This is a full-time 12-month, continuous appointment track, academic/professional position with appointment at the Assistant or Associate Librarian rank. The Libraries offers a competitive salary commensurate with skills and experience. Excellent benefits and moving allowance.

Duties:

Manages operations of unit including public access hours, reference service, archival processing, preservation, security, and budget resources. Works closely with CBI historians

and the Director of Archives and Special Collections to identify, solicit, and negotiate donation of historical materials in subject area. Participates actively with Archives and Special Collections units and CBI historians in unit planning and program development. Promotes collection and its use to internal and external users through collaborations with a variety of partners within the Libraries, the University, and beyond. Adds value and enhances access to collections by exploiting appropriate technology. Seeks grant and other external support to further CBI's mission and the University Libraries programs. Contributes actively to the archival, historical, and library professions as well as to the University Libraries and the University through research, publications, presentations, and professional engagement.

Qualifications:

Required Qualifications: ALA-accredited Masters degree in Library/Information Science or an advanced degree with relevant experience, background or training in archival practices; knowledge of the history and trends in information technology; excellent communication and interpersonal skills; demonstrated evidence of initiative and self-direction; and, ability to work in cooperation with colleagues and library clientele in a service-oriented, collaborative environment. Preferred: Undergraduate or graduate degree in history or information technology; significant relevant experience in a special or academic library; experience in reference and collection management in an academic or research library; familiarity with scholarly communication trends; experience in developing working partnerships with academic departments and other campus communities; evidence of innovation; facility with technology in academic contexts; and demonstrated involvement in professional activities. Demonstrated involvement with grants development.

Application Instructions:

Position is available June 15. Review of applications begins immediately and will continue until the position is filled. Send a letter of application, resume, and the names, addresses, telephone numbers, and email addresses of three current professional references to Human Resources, 499 Wilson Library, 309 19th Ave. S., Minneapolis, MN 55455. Please identify the application with UL211.

Please see the official position posting on the University of Minnesota website at:
<http://www1.umn.edu/ohr/employment/openings/job136311.html>.

Recent Publications

Aspray, William, Frank Mayadas, and Moshe Y. Vardi, Eds. *Globalization and Offshoring of Software: A Report of the ACM Job Migration Task Force*. Association for Computing Machinery. <http://www.acm.org/globalizationreport/>

Berlin, Leslie. *The Man Behind the Microchip: Robert Noyce and the Invention of Silicon Valley*. (New York: Oxford University Press, 2005).

Castleman, Paul. "Medical Application of Computers at BBN." *IEEE Annals of the History of Computing* 28:1 (January-March 2006): 6-17.

- Cohen, Daniel J. and Roy Rosenzweig. *Digital History: A Guide to Gathering, Preserving, and Presenting the Past on the Web*. (Philadelphia: University of Pennsylvania Press, 2005).
- Cphoon, J. McGrath and William Aspray, Eds. *Women and Information Technology: Research on Underrepresentation*. (Cambridge: MIT Press, 2006).
- Dutton, William H., et al. eds. *Transforming Enterprise: The Economic and Social Implications of Information Technology*. (Cambridge: MIT Press, 2005).
- Feurzeig, Wallace. "Educational Technology at BBN." *IEEE Annals of the History of Computing* 28:1 (January-March 2006): 18-31.
- Friedman, Ted. *Electric Dreams: Computers in American Culture*. (New York: New York University Press, 2005).
- Grier, David Alan. *When Computers Were Human*. (Princeton: Princeton University Press, 2005).
- Grudin, Jonathon. "Three Faces of Human-Computer Interaction." *IEEE Annals of the History of Computing* 28:1 (January-March 2006): 46-63.
- Keet, Ernest E. "A Personal Recollection of Software's Early Days (1960-1979): Part 2." *IEEE Annals of the History of Computing* 28:1 (January-March 2006): 31-45.
- Knuth, Donald E. *The Art of Computer Programming, Volume 4, Fascicle 4: Generating All Trees-History of Combinatorial Generation*. (Boston: Addison-Wesley Professional, 2006).
- Lecuyer, Christophe. *Making Silicon Valley: Innovation and the Growth of High Tech, 1930-1970*. (Cambridge: MIT Press, 2005).
- Makhoul, John. "Speech Processing at BBN." *IEEE Annals of the History of Computing* 28:1 (January-March 2006): 32-45.
- Markoff, John. *What the Dormouse Said: How the Sixties Counterculture Shaped the Personal Computer Industry*. (New York: Penguin, 2006).
- Medina, Eden. "Think Piece: Computer Memory, Collective Memory: Recovering History Through Chilean Computing." *IEEE Annals of the History of Computing* 28:1 (January-March 2006): 102-104.
- Neukom, Hans. "ERMETH: The First Swiss Computer." *IEEE Annals of the History of Computing* 28:1 (January-March 2006): 5-22.
- Partridge, Craig and Steven Blumenthal. "Data Networking at BBN." *IEEE Annals of the History of Computing* 28:1 (January-March 2006): 56-71.
- Petersson, Tom. "Facit and the BESK Boys: Sweden's Computer Industry (1956-1962)." *IEEE Annals of the History of Computing* 28:1 (January-March 2006): 23-31.

Schantz, Richard E. "BBN's Network Computing Software Infrastructure and Distributed Applications." *IEEE Annals of the History of Computing* 28:1 (January-March 2006): 72-88.

Schlombs, Corrina. "Think Piece: Toward International Computing History" *IEEE Annals of the History of Computing* 28:1 (January-March 2006): 107-108.

Walden, David C. and Raymond S. Nickerson. "Computing at Bolt Beranek and Newman: The First 40 Years, Part 2." *IEEE Annals of the History of Computing* 28:1 (January-March 2006): 4-5.

Weischedel, Ralph. "Natural-Language Understanding at BBN." *IEEE Annals of the History of Computing* 28:1 (January-March 2006): 46-55.

Williams, Bruce O. B. and Roger G. Johnson. "Ready Reckoners." *IEEE Annals of the History of Computing* 28:1 (January-March 2006): 64-80.

Featured Photographs: Burroughs Employee Recreation and Services

In October 1904, the Burroughs Corporation moved all 465 employees and their families to Detroit from St. Louis, Missouri, to work in the company's new Detroit factory. By 1913, Burroughs employed 4,000 in the United States and Canada. Many of these employees worked in Detroit.

Recreation and other services were considered beneficial to all members of the Burroughs family, and were offered at no cost to employees. The Detroit factory had a gym and swimming pool available, with weekly gym schedules for basketball, club classes, hand ball and swimming. A baseball field and tennis courts were also provided for use in the summer months by teams of Burroughs employees. A girls athletic club was formed for female employees and the families of all employees were also included in recreational activities, with dedicated time scheduled in the gym for children's classes.

Sports were not the only offerings – a Burroughs band and orchestra were formed, as well as a choral society. These groups gave a variety of concerts for employees, many over the noon hour. An employee library was established, as was a First Aid Hospital on the ground floor of the office building. The hospital treated minor accidents, scratches, cuts, scrapes, and minor illnesses. The hospital was fully staffed and employees were urged to use the facility for treatment since "cuts and scratches should not be ignored, as they often lead to blood poisoning if not promptly treated."

These photos are from the Burroughs online database:

<http://www.cbi.umn.edu/IMAGES/index>

The Burroughs database features over 550 of the more than 100,000 photographs that are a part of the Burroughs Corporation records held at CBI.

Karen Spilman