

CENTER FOR THE HISTORY OF INFORMATION PROCESSING

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CBI Annual Report

Year ending June 30, 2000

Introduction

The Charles Babbage Institute (CBI) has had a very exciting and successful year evaluating ongoing programs and practices, instituting new programs, moving into a new state-of-the-art facility in the Elmer L. Andersen Library, building productive new working relationships among staff, and strengthening CBI's ties to the communities it serves. CBI encountered many opportunities this year, partly resulting from a new management team at CBI and the occupation of the new building. Arthur L. Norberg reassumed the directorship after a five-year hiatus, Elisabeth Kaplan joined CBI as Archivist, Lynn Leitte accepted a position as Assistant Archivist, and Philip Frana signed on as the Project Manager of a new Software History Project. Jeffrey R. Yost continued to serve as Associate Director of CBI.

Norberg, Yost, and Kaplan carefully evaluated the programs of CBI, some of which stretch back to 1982, and found several elements in need of strengthening, replacing, or reinvigorating. The move to the Andersen Library offered the opportunity to assess CBI practices, everything from how archival materials are stored to placement of office personnel for more efficient use of time and talent. Reorganization of stored materials based on an analysis of projected and actual use facilitates access and reduces the time needed to retrieve materials for patrons who use the CBI archives. The archives collection strategy was reexamined and tighter connections were made to new areas of development in the information community and new program elements introduced. The *CBI Newsletter* was evaluated and expanded to enhance the

scope and nature of reporting on CBI programs, as well as activities and events at other institutions relevant to the history of information processing.

While staff experience and interest influence research at CBI, this area, too, was reexamined to address deficient areas in the history of information processing and to inform collection development efforts. A grant from the National Science Foundation stimulated more attention to software research and collecting at CBI. Grants from the Unisys Corporation funded two additional projects by CBI staff: an image database of 500 photographs from the Burroughs collection and an essay on one aspect of Burroughs' computing development.

Meanwhile, the Trustees and Directors of the Charles Babbage Foundation (CBF) deepened their interest in the programs and funding of CBI. A new CBF Task Force on Development worked closely with CBI staff to rewrite CBI's description and vision statements for use in fundraising. These efforts at crafting crisper and more integrated descriptions of CBI and its programs were highly coordinated with the internal efforts of the Institute's staff to more effectively portray the aims of the Institute for multiple purposes.

CBI's historical research program is designed to analyze and interpret developments and activities in information processing, produce bibliographic, historiographic and other resources to support historical research, and to assist in identifying important areas where CBI should focus its efforts in archival collecting. The archival program endeavors to secure and provide access

to historical materials that represent significant activities and events.

These materials then become the grist for more historical investigation. CBI staff identify areas needing attention, alert other organizations around the world, and work to ensure the preservation of valuable materials. Therefore, CBI takes the lead in collecting activities in some areas and plays an advocacy role in others.

This report highlights the historical research and archival programs' accomplishments of the past year, lists new materials acquired by CBI, and indicates the interactions between CBI and the information processing community.

Historical Research Activities

Current historical research at CBI concentrates on a broad range of developments in information processing technology, with particular emphasis on entrepreneurial, industrial, and institutional contexts. A recent focus of the Institute's research is on the understudied area of software history.

Burroughs. The cases of Burroughs and the British Tabulating Machine Company (BTM) are instructive to understanding cross national developments in the early computing industry. As part of a grant from Unisys, Jeffrey R. Yost is exploring the early history of computer development at these firms using the rich materials in the Burroughs collection at CBI. The cases demonstrate the complexity of coordinating international research

Recent Publications

Aris, John. "Inventing Systems Engineering" *IEEE Annals of the History of Computing* 22:3 (July-September 2000)4-15.

Aspray, William. "Was Early Entry a Competitive Advantage? US Universities That Entered Computing in the 1940s" *IEEE Annals of the History of Computing* 22:3 (July-September 2000)42-87.

Bardini, Thierry. *Bootstrapping: Douglas Engelbart, Coevolution, and the Origins of Personal Computing* (Stanford: Stanford University Press, 2000).

Davis, Martin. *The Universal Computer: The Road from Leibniz to Turing* (New York: Norton, 2000).

Hughes, Agatha C. and Thomas P. Hughes, eds. *Systems, Experts, and Computers: The Systems Approach in Management and Engineering, World War II and After* (Cambridge: MIT Press, 2000).

Joyce, Michael. *Othermindedness: The Emergence of Network Culture* (Ann Arbor: University of Michigan Press, 2000).

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CHARLES BABBAGE INSTITUTE NEWSLETTER

The Charles Babbage Institute for the History of Information Processing is sponsored by the University of Minnesota and the information processing community.

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SHOT 2000 in Munich

The Society for the History of Technology (SHOT) held its international meeting in Munich, Thursday, August 17 to Sunday, August 20, offering sessions of great topical, thematic and geographic variety. The Deutsches Museum hosted many of the events of the conference, including the opening night Plenary Session.

David Nye of Odense University gave the conference's opening address, "How the History of Technology Speaks to Other Fields of Scholarship," exploring potential roles that SHOT might play in furthering the development of the field and connections between disciplines. He suggested that SHOT make greater use of Web-based resources in order to appeal to broader audiences and stressed the need for extending the number of undergraduate (both minor and major) programs in science and technology studies (STS). The talk was followed by comments from Ulrich Wengenroth of the Munich Center for the History of Science and Technology and an active discussion by the audience. The latter included debate on the benefits and costs of writing for popular

audiences, the influence of the history of technology on public policy, and strategies for publicizing the field.

Midday Friday saw the meeting of the special interest group on Computers, Information, and Society. Approximately twenty scholars attended and discussed their research in this area, possibilities for future sessions, and the development of the field. CBI Associate Director Jeffrey Yost spoke on the research programs at CBI and the Institute's upcoming software history conference, "Unbundling History: The Emergence of the Software Product," that will be held at Xerox PARC.

Later that afternoon, the 1999-2000 and the 2000-2001 recipients of the Erwin and Adelle Tomash Fellowship, Thomas Haigh and Nathan Ensmenger respectively, gave talks in a session on emerging technological professions. Haigh spoke insightfully on the developing focus of corporations on information and computers in the 1950s. He detailed the boundaries of engineers and managers as they sought to use the computer to enhance their professional identities.

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News from the Archives

Recent acquisitions

If the past summer is any indication, the new fiscal year promises to be a good one for additions to CBI's archival collections. Materials received in the late spring and summer of 2000 include the papers of Lynn Conway, Earl Joseph, Earl Masterson and Peter Patton, as well as organization records of the Twin Cities chapter of the Association for Systems Management, records and publications of the Twin Cities Osborne Group, a collection of publications relating to computing in the Soviet Union donated to CBI by the American Institute of Physics, and a major addition to CBI's serial publications and computer manuals from Charles Jortberg Associates.

As these collections are processed, notices of their availability to researchers, along with brief collection descriptions, will appear in subsequent issues of the

CBI Newsletter.

(Note: please see "CBI Annual Report," for a list of some of the collections received in FY 1999-2000).

SAA meeting in Denver

The Society of American Archivists (SAA) held its 64th annual meeting in Denver over Labor Day weekend. From a plenary session featuring computer scientist / calligrapher / document theorist David M. Levy, to a presentation of recent user studies of archives Web sites, to a panel discussion on collaborative digital imaging projects, the program provided a wealth of information and professional contacts that will prove invaluable to CBI's archival program in the coming year.

Elisabeth Kaplan



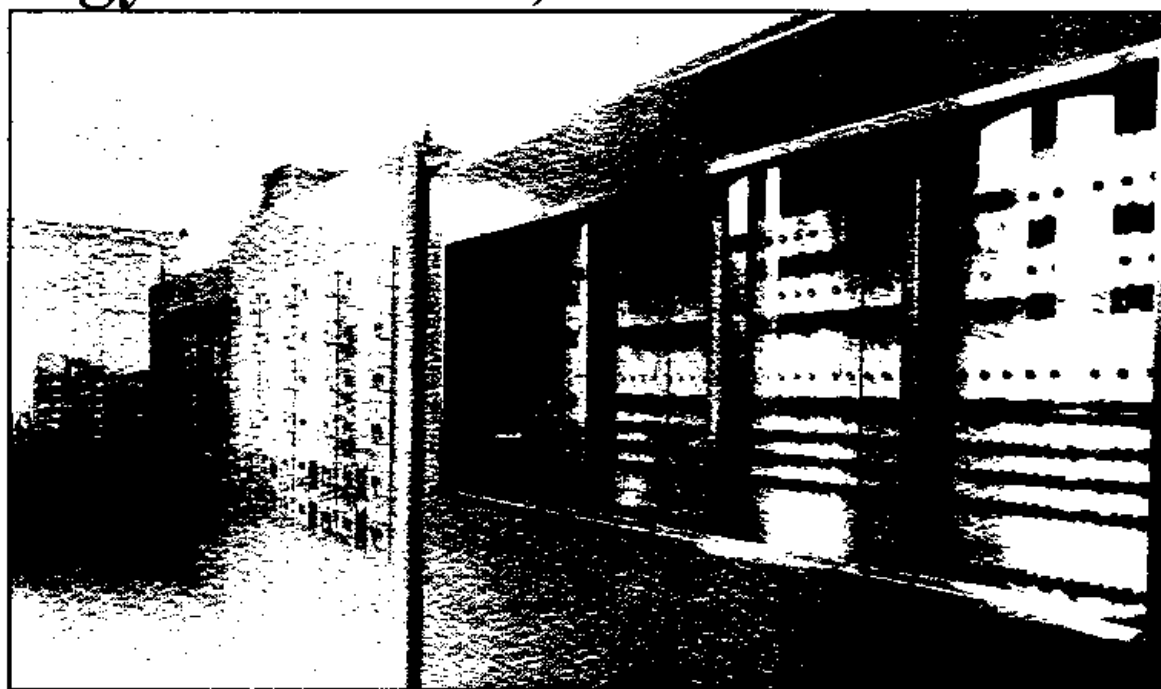
Computer Technology in Sweden, 1946-67

Editor's note: This article, by Anders Carlsson, Office for History of Science, Uppsala University, Sweden (email: Anders.Carlsson@idehist.uu.se), represents a slightly edited version of an article previously published in the Uppsala Newsletter: History of Science, no. 29, Spring 2000.

In late spring 1946, Stig Ekelöf of Chalmers Institute of Technology returned from a trip to the United States, where he had purchased electrical instruments and also studied advanced electro-technical laboratories in preparation for the postulated expansion of the field back at his own institute. Most of his devices were destroyed in an unfortunate fire in Gothenburg's harbor. This loss was, however, partially offset by all the impressions of the novelties that Ekelöf had been exposed to on his tour. Apart from reestablishing some of the pre-war contacts between Swedish and American researchers, he had witnessed what he called "super calculators," for lack of a proper Swedish term to use.

This incident illustrates the situation within science and technology in Sweden in the years following the war. A governmental policy for expansion of research had been formed back in 1942, and since the country had remained institutionally untouched by the war, it had a unique readiness to pursue this dormant agenda, which could now be augmented by wartime advances abroad. Even though most of the members in the technical and scientific communities had only a vague conception, if any, about the potential uses of "super calculators," Ekelöf's recommendation of immediate adoption of this new technology was in no way farfetched.

Ekelöf's 1946 trip overseas serves as one of the starting points for my Ph.D. thesis on early Swedish digital computing. The tentative title is *Elektronvalsen: Studier i svensk dator teknik, 1946-67* ("The Electron Waltz: Studies in Swedish Computer Technology, 1946-67"). Historians and political scientists have already examined the political arguments and needs for computer technology in the 1940s and 1950s, thus sketching a very broad and policy-centered picture of the



BESK (Binar Elektronisk Sekvens-Kalkylator) was constructed under the supervision of Erik Stemme, who spent the 1947-48 academic year at RCA and IAS in Princeton.

events following a public investigation about "mathematical machines" in 1947. My aim is to deepen that view by concentrating on three themes that have not been adequately treated. These divergent themes all relate to the two governmentally owned and operated mainframes, BARK and BESK, which were the only digital computers in Sweden until 1956.

Evaluation

The 1947 investigators noted that fast computing machines were being developed at various institutions in the US and argued that similar machines should be installed in Sweden. Their motives were not the least bit educational: there were specific and urgent calculation needs within the military as well as a more general goal of raising the quality of "industrial mathematics" and pushing mathematically advanced disciplines forward. Once a decision had been made by Parliament, which appropriated no less than SEK 2,000,000 to start with, there were several technological and organizational options concerning what form of computing should be encouraged by policymakers and experts. The purpose of addressing this theme is thus to describe the period of investigation and learning, 1945-53, when digital computing technology became a field of study.

The implementation of the 1947 investigation has been considered a quick process. Two measures were taken

immediately. The first was to award five scholarships, sending five young men with differing backgrounds to Oslo, Norway, RCA and the Institute for Advanced Study in Princeton, and Harvard and MIT in Cambridge, Massachusetts during the 1947-48 academic year. Earlier exchanges between Sweden and the US can be considered forerunners to this one, although the scholarship-holders *in situ* generally met open attitudes and numerous international visitors, in particular at Howard Aiken's and John von Neumann's projects at Harvard and IAS respectively. One central concern is to describe, in some detail, the environments where these five men were accepted and their functions when they returned to Sweden.

The second measure was to form *Matematikmaskinnämnden* ("The Board of Computing Machinery") in Stockholm. This board faced all sorts of options from the very first day of its existence. The first outcome, apart from surveying the field, was the construction of the plugboard BARK machine (Binary Automatic Relay Calculator), planned during the engineers' stay in the US and inaugurated in 1950. BARK, the Board had concluded, should depend solely on Swedish components in order to guarantee a kind of "technical" neutrality. These were the days of the Marshall Aid, and the fear of new international conflicts apparently reached into the Board's

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and development joint ventures, the struggle to create advanced products in an emerging technology while preserving existing revenue streams, and the cultural and technical challenges involved with assimilating R&D resources from acquisitions in a rapidly changing technologically based industry. Yost's research identifies the two firms' analogous perspectives on computer R&D management and their similar acquisition strategies during the decade, findings that challenge the focus on national differences arising from the many implicit and explicit comparisons between BTM and IBM. This essay will be submitted for publication in the coming fiscal year.

Engineering Research Associates/Eckert-Mauchly Computer Corporation/Remington Rand. Much has been written about the Eckert-Mauchly company and the development of Univac, but the attention to ERA and Remington Rand has been scattered. This study is an attempt to bring R&D efforts by these three companies into one place. A major portion of a book-length study will be devoted to ERA and EMCC—their origins, development, contributions, and interactions with others from 1945 to 1951. By 1950-51, both companies were having problems with financing and had to resort to transfer of control to backers in order to survive. This carried the threat of absorption and both companies were acquired by Remington Rand by the end of 1952. Within Remington Rand, ERA and EMCC operated as separate divisions with all the cooperation and conflicts one might expect until the purchase of Remington Rand by Sperry Corporation. A secondary concern of this book is Remington Rand and its computing divisions in the years 1952-57. Analysis of the activities of the divisions and of the Norwalk Laboratory of Remington Rand, which focused on electronic tabulators, helps to provide a more complete history of Remington Rand's role in the early industry.

Software History. This year CBI inaugurated a three-year study, funded by the National Science Foundation, to

develop new tools for use in the history of software. The project, composed of four parts, will (1) establish an electronic network for research in history, which, through a series of committees, will (2) develop an on-line dictionary of terms relevant to the history of software. The four principal investigators, Robert W. Seidel, Jeffrey R. Yost, Elisabeth Kaplan, and Arthur L. Norberg, along with the Project Manager, Philip Frana (who joined CBI in May 2000), will (3) conduct a number of interviews with significant figures in the software field and (4) organize an on-line journal publishing articles in the history of software. As of June 2000, much of the preparatory research and planning was complete. A project Web site (at URL "<http://www.cbi.umn.edu/shp/shp.htm>") includes information about the project, sample dictionary entries based on research in the primary literature, and links to bibliographic aids. One committee is about to be launched, and several others are planned. A larger aspect of this work is the research being done to enhance collection development in software history by CBI.

Archives

CBI's move to the Andersen Library stimulated several initiatives to evaluate and improve virtually all of the archives' functions, including accessioning, processing, housing, and retrieving the collections, as well as providing reference services to researchers. The new storage facilities, reading room, processing area, exhibit space, and office space are well-designed and well-appointed areas for these activities and enhance the ability of CBI to offer service to users. As part of the move, an accessioning backlog that had accumulated over the past two years was addressed and eliminated. Staff reviewed and reevaluated the entire CBI collection with respect to preservation concerns. The first stage in a major initiative to improve electronic access to CBI's finding aids was concluded this year; in a special project funded by the University Libraries' Digital Collections Unit, CBI's finding aids were outsourced to a local company for mark up in SGML in accordance with a new international

standard, Encoded Archival Description.

Thirty-five collections were acquired during the year, and the CBI Archivist reinstated an intensive collection development program, which should bear significant results over the next few years. Among acquisitions were: microfilm of Charles Babbage Papers from the British Library; Charles Bradley Papers; Honeywell vs. Sperry Rand trial exhibits microfilm; ICP software directories; manuals, product literature, serials, newsletters; MECC-UMN Educational Courseware documentation for the Apple 2; Russian computing literature from the IAP; and Marvin Stein Papers.

These examples illustrate the impressive depth and breadth of the CBI Collection. Monograph additions to CBI's reference collection have been significantly improved and expanded in the past year with the support of an acquisitions budget provided by the University Libraries.

Also as part of the move, CBI transferred its web site to a library server and began intensive work on the redesign of the site, to be unveiled in Fall 2000. The site contains all of the collection information available at CBI, plus other information about forthcoming events related to the history of computing and relevant information at other sites. In the coming year, CBI will mount a series of virtual exhibits. Access to the image database of 500 photographs from the Burroughs Collection, a project sponsored by the Unisys Corporation, will also be provided through the CBI Web site.

During the year, CBI strengthened its ties to the University Libraries through participation in a number of activities related to the libraries' outreach program. CBI archives staff prepared several exhibits for the grand opening of the Andersen Library. Elisabeth Kaplan is a member of a new Special Collections and Archives steering committee, which develops policies and procedures for the Andersen Library.

Adelle and Erwin Tomash Fellows

Thomas Haigh, Tomash Fellow 1999-2000. During his tenure as the Tomash Fellow, Mr. Haigh virtually completed his dissertation at the University of Pennsylvania. His work examines how claimed

expertise in information processing was used to construct different types of authority within the social world of corporations. The study focuses on the development and management of large-scale, operational information processing systems by corporate computing staffs since the 1950s. Haigh visited the CBI archives and performed extensive research in the collections, and participated as a rapporteur in the Paderborn conference on the history of software.

Nathan Ensmenger, Tomash Fellow, 2000-2001. In February, Nathan Ensmenger was awarded the Tomash Fellowship for next fiscal year, but even before his tenure began, he was invited to participate in the Paderborn meeting. There he delivered a paper co-authored with William Aspray, Executive Director of the Computing Research Association and a former holder of this fellowship. Ensmenger also served as a rapporteur for the meeting. His dissertation explores the history of the computer in the modern corporation as viewed from the perspective of the professional programmer. His focus is on the conflict between the craft centered practices of the early programmers and the "scientifically" oriented management techniques of their corporate managers.

The list of Tomash Fellows grows each year as do the many accomplishments of past fellowship recipients in the history of information processing. We are pleased to offer this fellowship, and are extremely gratified that it honors the founders of CBI, Adelle and Erwin Tomash, who have given generously to support the fellowship program and to CBI generally.

Conferences

CBI cosponsored an international conference in April 2000 held in Paderborn, Germany. The event, sponsored by the Heinz Nixdorf MuseumsForum, devoted attention to "Mapping the History of Computing: Software Issues." Organized by a committee with international membership, the conference brought together historians, computer scientists, sociologists, and museum specialists to explore

issues needing investigation to strengthen the understanding of the history of software development and application. A proceedings volume will be published next year.

As an outgrowth of the Paderborn conference, which devoted only a little attention to information industry matters, CBI planned a conference on "Unbundling History: Emergence of the Software Product" to occur in September 2000 in Palo Alto, California, at Xerox PARC. Software entrepreneurs and historians will explore the history of software product development before and immediately after the famous unbundling decision.

Norberg delivered a paper in July 1999 at a conference sponsored by the London School of Economics on the history of government information policy with an international comparison. Papers included exploration of policies in the United States, France, the Netherlands, Japan, the United Kingdom, and Russia. A proceedings volume is forthcoming.

CBI staff participated in a number of history and archives conferences. Kaplan attended a meeting of archivists from high-tech corporations and presented papers at the annual meetings of the Society of American Archivists and the Midwest Archives Conference. Yost attended the annual meetings of the Society for the History of Technology and the History of Science Society, participating in sessions at both conferences. Norberg attended the meeting of the Society for the History of Technology.

Publications

Elisabeth Kaplan, "We Are What We Collect, We Collect What We Are: Archives and the Construction of Identity," *The American Archivist*, 63(1), Spring 2000.

_____. Co-author, "Mind and Sight: Visual Literacy and the Archivist," in *American Archival Studies: Readings in Theory and Practice*, Randall C. Jimerson, ed., (Scarcrow Press, 2000).

Arthur L. Norberg and Judy E. O'Neill,

Transforming Computer Technology: Information Processing for the Pentagon, 1962-1986, paperback edition, (Baltimore, MD: Johns Hopkins University Press, 2000).

Jeffrey R. Yost, *A Bibliographic Guide to the History of Scientific Computing, 1945-1975*, (Westport, CT: Greenwood Press, forthcoming).

_____. "Edward A. Feigenbaum," in Raul Rojas, ed., *Encyclopedia of Computers and Computer History*, (Chicago and London: Fitzroy Dearborn Publishers, forthcoming).

Support

We wish to acknowledge the important and multi-dimensional support CBI received from the University of Minnesota, including the Institute of Technology and the University Libraries. The Charles Babbage Foundation made a substantial grant to CBI this year, and investigated a planning process for a major fund drive over the next few years to further expand their support to CBI. Much of the CBF support resulted from the annual solicitation campaign of the Friends of CBI, whose major donors are the Trustees of the Foundation. The Unisys Corporation made another grant to the Institute for work on the CBI web site and some further work on the history of Burroughs (the Yost study noted above). We are grateful to Ms. Bernice Arnold and The Tomash Family Foundation for a major contribution to the endowment fund that supports the Adelle and Erwin Tomash Fellowship. The Tomash Family Foundation also provided support for another in a series of CBI conferences. The conference to take place in September 2000 in Palo Alto, California, will be devoted to the early history of the software industry. A complete list of this year's donors appeared in the Spring 2000 *CBI Newsletter*. We want to express our deepest gratitude to these institutions, firms, and individuals who continue to show strong support for CBI and its program.



Swedish Computer History

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work. Consequently, it drew heavily on existing resources such as supplies of relays from Swedish industries. Despite the needs identified in the 1947 investigation, BARK was used almost exclusively to calculate ballistic tables. The record reveals that BARK was, in fact, designed with consideration to military needs for precision.

BARK was taken out of service soon after the second computer, BESK (Binary Electronic Sequence Calculator), became operational in late 1953. The reason for this unique maneuver was limited space at the Board of Computing Machinery, indicating that computing was not yet prioritized by policymakers. It was also an indication that the new machine's capacity overshadowed BARK's. Being the only digital computer in the country, BESK, in essence an IAS-style stored-program machine, was used closer to the ideal set by the investigation: to help various military, scientific and private institutions in their calculations. It was disassembled in 1967 and transferred to Tekniska Museet in Stockholm.

The users

Once a practice had been established around the computers, the Board of Computing Machinery transformed from a planning organization into an operational one. It was housed in a former building at the Royal Institute of Technology, then a very central location in Stockholm, putting it into proximity with several customers such as insurance companies and university departments. It also offered relevant courses, spreading the notion of computers as useful resources.

It should be made clear, however, that the one major user between 1953 and 1956 was SAAB (*Svenska Aeroplan AB*, "The Swedish Aircraft Corporation"). During these years, SAAB designed the Draken fighter for the Swedish Air Force and used BESK for wing instability and general aerodynamics calculations. The Board was run as a service agency until

1963, when it was finally reorganized and incorporated into the Statskontoret, a governmental organization developing administrative routines. BESK also performed "public operations" - unique ones but nevertheless important as pedagogical events. In the 1960 elections, the Swedish Broadcasting Company initiated CBS's use of the UNIVAC during Walter Cronkite's appearance on election night in the US in 1956, by introducing a BESK-generated prognosis of the results.

Although all of BESK's customers deserve individual study, I will focus here on the second largest user: the Department of Meteorology at Stockholm University,

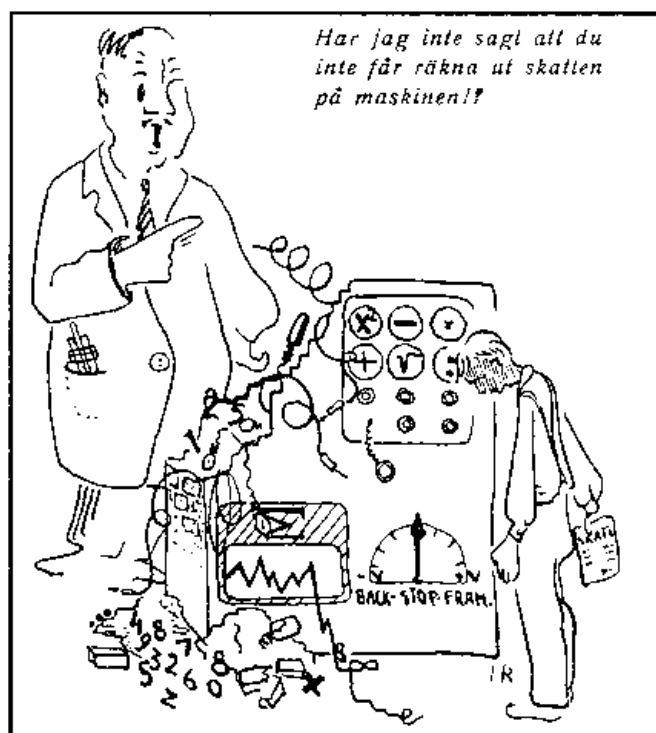
professionalization and social recognition of the Swedish weather service. The conceptualization of such a change was negotiated within the meteorological community, where, in the early 1950s, the synopticians were referred to as the "subjective" meteorologists by numerical forecasters, who subsequently labeled their own methods as "objective." Labels such as these address questions about the status of meteorological knowledge. What did it mean to be scientific? Should forecasting be done by experienced professionals or be delegated to a machine? Here, the Swedish-American professor of meteorology at MISU, Carl-Gustaf Rossby, was instrumental in pushing his faculty in the "objective" direction and also establishing collaboration between Stockholm, IAS in Princeton, and various other international institutions. It certainly helped that the design of BESK was similar to the IAS machine. In fact, when one meteorologist from IAS skillful in coding came to Stockholm during the last months of the assembly of BESK, he was surprised by the easy transition.

In public

A third theme will investigate how computing technology was incorporated into a political discourse. In a debate about automation in the

second half of the 1950s, the meaning of computing was altered to become the core component of the modern factory or the modern office — the modern society. This *politicization* of "the computer" was at the same time a *popularization* of "the electron brain," producing a vast number of visual and verbal images, adding further meanings to computer technology in general.

The automation debate was opened in late 1955 at a conference entitled "Technology and Tomorrow's Society," organized by the Social Democratic Party and the main labor union (LO). The talks give insights into the making of Sweden as a modernized country, how it progressively singled out new technology as a main feature in the policy of growth. In this process, the engineering profession was more highly valued than others.



"Didn't I tell you that you mustn't calculate taxes on the machine!?" This caricature accompanied a presentation of BARK (Lundagård, October 28, 1950).

MISU. This choice will reveal some of the possibilities for studying the interplay between the construction of the BESK machine ("technology") and the rationale to learn about and exploit its qualities within a discipline ("science"). It will also address questions about scientific expertise, giving some examples of unforeseen uses of a complex technology.

Several public investigations about the weather service in Sweden were conducted from the early 1940s onward. By the end of that decade, the prospect of calculating the weather with computers reinforced a trend towards further

Automation was indeed the domain of engineers; in fact one commentator at the conference explicitly declared that coding should be seen as the important new activity, requiring certain skills. Accordingly, in the debate following this manifestation, the electron engineer was not only proposed to master these new machines serving the automated factory. He ("he" was substituted with "she" only when the revolution was to be caricatured) would also be the end product of the more general educational renewal demanded by this new technology.

Here, the cybernetics of Norbert Wiener acquired a specific meaning in the sense that his pessimism, most clearly expressed in *The Human Use of Human Beings*, was seen as deeply irrational. How could automated factories exist if there would be no people making money to buy the products produced in those factories? Wiener was thus used as an authority whose misreading pointed at the many complexities framing the issue rather than one representing a serious counter-argument. Analyzing Wiener's doctrines, one observer suggested that "the waltz is proceeded with electrons," also hinting at a more general complex of symbols in which the electron could be seen as the messenger of peace and equilibrium as opposed to the more violent nucleus.

Computer technology came to function as a rhetorical tool for the exposure of the profession of engineering — the primary argument. Furthermore, the automation debate seems to have been congenial with the Swedish computer technology policy. The understanding of computing had changed during the 50s, in Sweden and elsewhere. As a result, the government decided in 1956 to cut financial support for further development of the BESK machine, in favor of commercialization by letting Åtvidaberg Industries, until then a manufacturer of mechanical calculating devices, proceed with a development agenda. Apart from the drawings of BESK, Åtvidaberg could profit from hiring several key persons from the Board of Computing Machinery. Here I will argue together with historian Hans De Geer, who has identified a shift from electronic towards administrative data processing in a case study of one

political investigation made in 1955-56, and against others, who have seen this transition as a policy failure.

Final remarks

My thesis, in part, will be a story of technology transfer. In the early years, a few advanced institutions in the US played crucial roles in letting Swedish representatives closely study ongoing work; these contacts were maintained and used in the years to come. But at the same time, an important new technology, digital computing, was considered meaningful at the local level. This raises a number of significant questions, including: what were the needs in Sweden after the war; what options were there; and how did needs and options interact? What was the significance attributed to the BARK and BESK machines by different groups as they were planned, built, used and taken out of service? Is it fair to separate "technical" from "social" and "cultural" qualities? A closer understanding of the Swedish case will highlight issues in a process often referred to as "the computerization of society," challenging popular accounts presenting this process as a series of necessities, and expanding understanding about the nature and content of technological change.

Anders Carlsson, Uppsala University



Recent Publications

Continued from page 2

Land, Frank. "The First Business Computer: A Case Study in User Driven Innovation" *IEEE Annals of the History of Computing* 22:3 (July-September 2000) 16-26.

Lee, John A. N. et. al. "The US Bombes, NCR, Joseph Desch, and 600 WAVES: The First Reunion of the US Naval Computing Machine Laboratory" *IEEE Annals of the History of Computing* 22:3 (July-September 2000) 27-41.

Levy, Steven. *Insanely Great: The Life and Times of Macintosh, the Computer that Changed Everything* (New York: Penguin Books, 2000).

Meissner, Gerd. *SAP: Inside the Secret Software Power* (New York: McGraw-Hill 2000).

SHOT 2000

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Ensmenger followed with an equally compelling paper, evaluating the rhetorical use of the software crisis and giving suggestions for new ways of integrating the history of the emerging software professions into the larger social and cultural history of computers and information technology.

On Saturday Jeffrey Yost gave a paper in a session entitled, "Reconceiving Computer Cultures." He spoke on the early development of computer R&D at the Burroughs Corporation and British Tabulating Machine Company (BTM) in the 1950s, suggesting how similarities between the two firms' strategic planning and management called into question the focus on national differences that arises from the traditional comparisons between BTM and IBM. (for more detailed discussion of the research project see the Summer 2000 *CBI Newsletter*).

Petri Saarikoski of the University of Turku then spoke on the consumption and uses of personal computers in Finland in the 1980s and 1990s. Pierre Mohnier-Kuhn of Universite Paris-Sorbonne followed, providing an analytical model for comparing developments in the British, French, Japanese, German and American computer industries in the decades immediately following World War II. Tomash Fellow Janet Abatte served as the commentator and gave insights on connections between the papers and broader questions raised by the implicit and explicit cross-national comparisons in the studies.

Jeffrey R. Yost



Redmond, Kent C. *From Whirlwind to MITRE: The R&D Story of the SAGE Air Defense Computer* (Cambridge: MIT Press, 2000).

Smith, David E. *Knowledge, Groupware, and the Internet* (Boston: Butterworth-Heinemann, 2000).

Sobel, Robert. *Thomas Watson, Sr.: IBM and the Computer Revolution* (Washington, DC: BeardBooks, 2000).

Upton, Molly. *The Millenium Edition: The IT Industry 1964-1999: As Seen by the Gray Sheet*. (Framingham, MA: International Data Corp., 2000). □

Fifty Years Ago

The patentability and copyrightability of information retrieval systems and software is a fifty year old debate. In the late 1940s Calvin N. Mooers developed a system called Zatocoding, a punched card information retrieval system (see photograph). It used a series of specially notched cards. Each notch was a descriptor representing information in the document to which that card referred. In 1950, the courts determined that Mooers could not claim to be the inventor or originator of using "superimposition of a random-like code on a punched card" for information retrieval, nor could he claim such a system as Zator Company's exclusive property. Mooers first applied for a US patent on the Zatocoding system on September 17, 1947, and a British patent on September 3, 1948. The British patent was approved and sealed

on February 18, 1953. Yet, in 1963 Mooers was still appealing to the US



patent office over Zatocoding. Information taken from the Calvin Mooers Papers (CBI81).

30 Years Ago

During 1970 the Report Program Generator II programming language, more commonly known as RPG II, was developed by International Business Machines (IBM) for its System/3 commercial computers. The programming language was intended for use in payroll, invoicing, and other accounting operations applications. The product was designed to function on the IBM 1130, the IBM 1800, the RCA Spectra 70 Systems, and the Univac 9200/9300 Series as well as the IBM System/3. IBM described it as the "highest-level language used in data processing today. It is perhaps the easiest to learn, easiest to use, easiest to maintain, fastest to code, and most machine-independent, problem-oriented computer language available."

Lynn Leitte

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