## CENTER FOR THE HISTORY OF INFORMATION PROCESSING

# Norberg Relinquishes Directorship of the Charles Babbage Institute

Arthur Norberg, after over a decade of leadership of the Charles Babbage Institute (CBI), announced his intention to step aside as director. His resignation will become effective with the appointment and arrival of a new director, expected to occur in mid 1993. He plans to remain on the University of Minnesota faculty where he will teach full-time in the Program in the History of Science and Technology.

During his years as director, Norberg engaged in an active historical research program, planned programs and activities for CBI, implemented University policies, developed budgets, and helped to represent the entire CBI program to supporters and constituents. Norberg directed the activities of the Charles Babbage Foundation (CBF) and helped devise and execute a major fundraising campaign that raised operating and endowment funds for CBI, including the Engineering Research Associates, Inc. (ERA) Land-Grant Chair in the History of Technology.

Norberg arrived at CBI in September 1981. Only one month after arriving at CBI, Norberg met with the CBF Board. Together they developed a general plan

*"I have the highest respect and regard for the great contributions that Arthur Norberg has made in developing CBI from concept to reality, a reality that those of us at the University of Minnesota are most proud." Ettore Infante, Provost and Vice-President for Academic Affairs, University of Minnesota*

that has been the basis for CBI activities in the 1980s and into the 1990s.

In the beginning, Norberg concentrated on three activities. First, CBI had to be defined as an institution. Norberg and Lavonne Molde, at the time the only staff, organized the office, set up the conditions for hiring additional staff, and directed an outreach program to make as many people aware of CBI as possible. They worked closely with members of CBF led by Erwin Tomash, Chairman and Founder of CBF/CBI. Policies and procedures were needed and more staff had to be added to pursue a program. A cadre of graduate students joined CBI during 1981-82. These students generated a data base of information on people, organizations, and events in the history of information processing. CBI employed much of this information over the next few years in programmatic activities.

The second activity CBI focused on was archives development. From the beginning, Norberg ensured that CBI engaged in an aggressive collecting program.

The third activity crucial to CBI's successful development was fitting it into its university setting. CBI was relatively new at the University of Minnesota and it was necessary to merge its program with that of other University units. Norberg and Molde took every occasion to interact with other parts of the University and to become part of the University community.

Keeping in mind lessons learned from his tenure as head of the History of Science and Technology Program at the Bancroft Library at the University of California, Berkeley, Norberg engaged
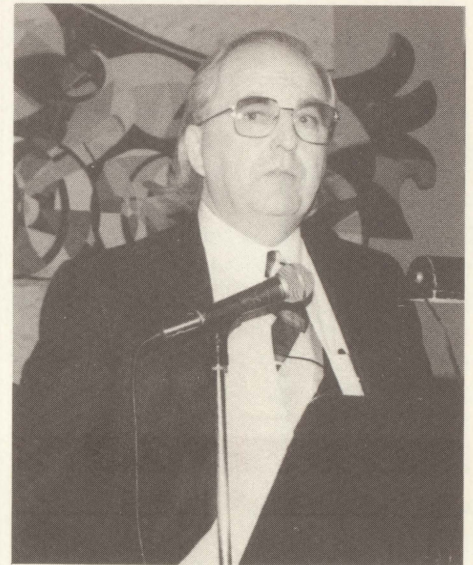


*Arthur L. Norberg*

in wide consultation with the community during his first two years at CBI. CBF's program committee met regularly and played an influential role in CBI activities. Norberg made regular visits to colleagues at other institutions and programs, and started visits to companies in the computer industry. After talking with a multitude of people, he developed a set of specific activities, which was endorsed by CBF and the University.

CBI activities focused on the technical topics in computing from development of scientific concepts through applications of computing, the range of enterprises associated with the growth and practice of computing from the academy to industry, and the role of government. The definition of these activities was quickly followed by the addition to CBI's staff of another historian as Associate Director, William

Aspray, and Bruce Bruemmer as Archivist. Working as a team, Norberg, Aspray, and Bruemmer pursued a tightly woven range of projects in historical investigations and archives development.

The achievements and influence of CBI over the next several years resulted from its carefully circumscribed mission. The historical and archives projects were inextricably woven together to reenforce each other. CBI does historical research to know better what is important to assemble in the archives or what to encourage others to collect in their archives. CBI assembles archives to help to understand what research problems are important to investigate, whether by CBI or others. History and archives projects inform and aid each other.

Norberg and CBI played a key role in defining a historical research area--information processing--that is fundamental to our understanding of events in the 20th century. As CBI came on the scene in 1978, activity in history of

## CHARLES BABBAGE INSTITUTE
# NEWSLETTER

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*Production of this newsletter is supported by the Charles Babbage Foundation.*

information processing was just emerging. CBI joined the Computer Museum and the editorial staff of the <u>Annals of the History of Computing</u>, both organized at the same time as CBI, the Smithsonian Institution, and the American Federation of Information Processing Societies (AFIPS) in promoting the history of information processing. Now a vital field exists. The fruits of the research and collections developed by

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*"[Norberg] undertook the rearing and development of the infant CBI and raised it to become the strapping youngster it is today."*
Erwin Tomash, Chairman of CBF and Founder of CBI

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people associated with CBI have been crucial for this development. These included Aspray's two books and a significant number of articles and Bruemmer's contributions to guides and surveys, and articles on archival subjects. The CBI team participated in a number of investigations under the rubric of a National Collecting Strategy Program for preserving the historic records of computing, from which three significant guides to appraisal and collections

## History and Development of Informatics Conference

The History and Development of Informatics Conference, originally scheduled for September 1992, has been rescheduled for 13-15 October 1993 at Sophia-Antipolis, France. There are five themes of the conference.
1) History of the Computer Industry including industrial policies, computer manufacturers, service and software companies, trades, norms, and media.
2) History of Teleprocessing and Networks.
3) History of Automation and Control Theory and of their Relationships with Computing.
4) Evolution of Knowledge Representation and Processing including the contribution of informatics to the theory of knowledge and the evolution of concepts, tools, and communication

emerged.

The CBI archives has grown in quality and depth during this period. The University Libraries have benefitted greatly from the presence of historians and archivists in CBI. All CBI's collections and reference materials are included in the University's automated data base Lumina, making information about them available to the entire University community and many researchers from elsewhere around the state and nation, and around the world through inclusion in the national Research Libraries Information Network.

CBI has participated in international projects and meetings, some of which it led. Conferences and workshops on the campus and at other sites around the country have made CBI a leader in the setting of the research agenda in this area of the History of Science and Technology. With the sponsorship of CBF, eminent speakers in computer science came to the campus. Also with CBF sponsorship, CBI continues to offer a graduate fellowship in the History of Information Processing, the Adelle and Erwin Tomash Fellowship.

Norberg played an essential role in leading and participating in all of these

between people and computers.
5) Impact of Computing on the Conception and Manufacturing of Industrial Products.

Anyone wishing to present a paper should send three copies of a two-page outline by November 1992 to:
*Colloque Histoire de l'Informatique INRIA, Bureau des Relations exterieures 2004, route des Lucioles - BP 93 06902 Sophia-Antipolis, France email: simoneti@sophia.inria.fr telephone: 33 - 93 65 78 64 FAX:     33 - 93 65 79 55* □

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CBI activities. In addition, he led several research projects of his own within CBI's program. The major fruits of Norberg's research program in CBI will appear in the next year of so. First, a four year study of the Information Processing Techniques Office (IPTO) of the Defense Advanced Research Projects Agency, conducted with Judy O'Neill, who replaced Aspray as Associate Director, and Professor Kerry Freedman, also of the University of Minnesota, was completed in October 1992 and submitted to the Department of Defense. Later, the report will be revised for publication as a book. Second, Norberg resumed the industry project he began earlier and postponed due to the IPTO study. This study should be completed soon.

While attending closely to CBI and to historical research, Norberg participated in the teaching program of the University, primarily in the Program in the History of Science and Technology and secondarily in the Management of
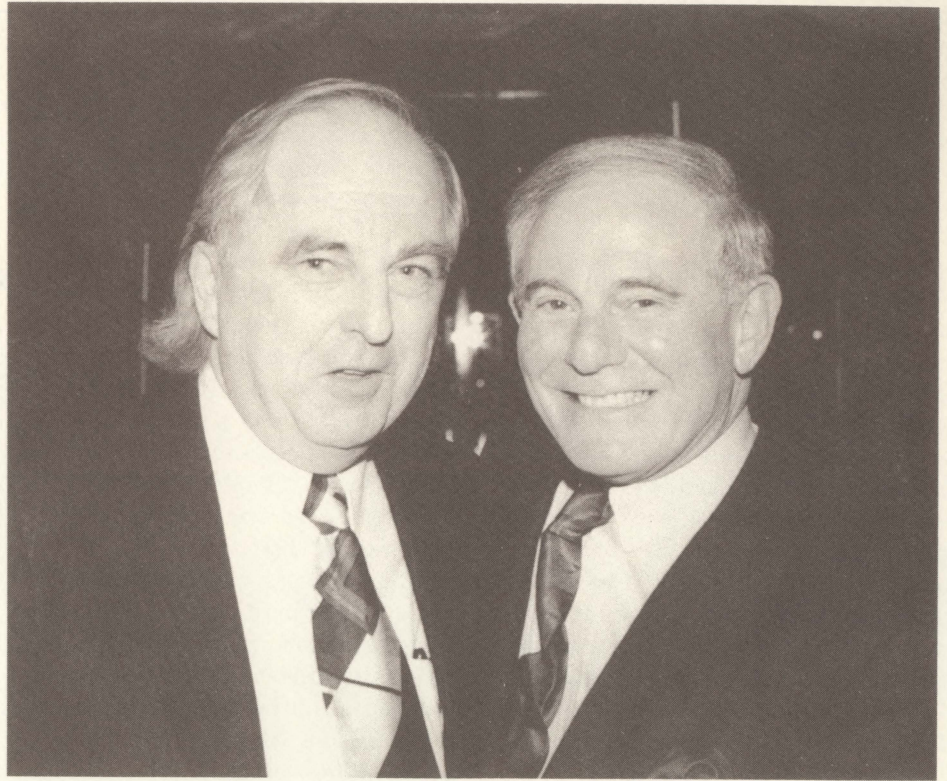
*CBI Director Arthur Norberg and Founder Erwin Tomash*

# DARPA/IPTO History Project Summary

For the past four years, CBI has been engaged in a historical study of the Information Processing Techniques Office of the Defense Advanced Research Projects Agency. The report prepared as part of this study was completed and sent to the Department of Defense in October 1992. Provided here is a summary of the conclusions to the the report.

The Information Processing Techniques Office (IPTO) of the Defense Advanced Research Projects Agency (DARPA) provided substantial research support for the development of computer science and engineering from its founding in 1962 to the mid 1980s. This study is a history of IPTO's origins, development and changes, and the research programs it supported during this period. The study includes an analysis of the management of the office, the interactions of its staff with the research and development community, and its military-related mission. The influence of IPTO programs has been charted and interpreted in terms of four case studies of significant developments in computer

science and engineering: time-sharing, networking, graphics, and selected areas of artificial intelligence.

This study reveals that IPTO employed a dynamic, highly-effective, well-respected, and insightful approach to R&D funding. The characteristics of this approach resulted from several factors: the quality of the people brought in to manage the office, the policies and practices of the Department of Defense (DoD) with respect to R&D funding, the size of IPTO budgets, and the interaction of the research community and industry to the ambitious objectives of IPTO.

Starting with a clear vision of its mission, IPTO never lost sight of the goal to support the objectives of the DoD. Although the focus was always foremost on applications of computing to its defense mission, the general nature of computing was also affected, and many new techniques entered the general economy. Thus, IPTO achieved a reputation for being able to select for funding areas of computing that had broad implications for both the civilian and military sectors.

Throughout its history, IPTO focused its program on research in information technology that would provide more capable, interactive, flexible, and intelligent computer systems that could be used in the command-and-control program of DoD. Under its various directors, IPTO repeatedly advanced ambitious goals for selected R&D problems in computing to make systems more intelligent, to act as a human's assistant; more flexible, to perform under a wider range of circumstances; more capable, to operate on a wider range of problems; and more interactive, to be more responsive. Also, reaching these goals led to contributions to the content of the emerging computer science and engineering discipline and enhanced the capability of DoD to perform its mission.

Focusing on the needs of the DoD command, control and communications ($C^3$) system, IPTO established a series of R&D programs to support the development of new and improved computer systems for use in $C^3$ systems. This study contains an account of the origins

and evolution of many of these programs. That account exhibits IPTO's fundamental objectives in these programs, as well as the intricate overlap of programs to achieve integration of results for use in applications. While it is not possible to tell IPTO's story without reference to the many institutions and researchers it relied on to achieve these ends, we kept references to contractors to the level of examples to illustrate IPTO program goals. However, IPTO's interaction with the R&D community is described to illustrate how important this interaction was for the generation of ideas, concepts, achievable projects, and results. In the technical areas of IPTO's interest, IPTO directors and program managers took the lead in this interaction with the community. In our examples from wide-area networking, AI, graphics, and VLSI, this leadership was determinative as well as facilitative. While we recognize developments in these technical areas might have happened anyway, the

# IEEE Fellowship in Electrical History

The Institute of Electrical and Electronics Engineers (IEEE) invites applications for its 1993-94 Fellowship in Electrical History.

The Fellowship supports either one year of full-time graduate work in the history of electrical engineering and technology at a college or university of recognized standing or up to one full year of post-doctoral work in the same field for a recent graduate.

The IEEE Fellowship in Electrical History is made possible by a grant from the IEEE Life Member Fund and is administered by the IEEE History Committee.

The deadline for submission of all application materials is 1 February 1993. Further information and application materials may be obtained by writing to:
*Director*
*Center for the History of Electrical Engineering*
*Rutgers - The State University of New Jersey*
*39 Union Street*
*New Brunswick, NJ 08903-5062*     □

specific character of the results, the contexts of the R&D, the timetables in which the results were accomplished, and the applications to which the results were put were determined by IPTO. It is for this reason we use the phrase "leading role" to characterize IPTO's influence in computing. This study provides an analysis of three general areas in which this role is most evident.

**The first general area was IPTO's development of an infrastructure for R&D.** To accomplish its objectives, IPTO orchestrated a research community and a research discipline. The infrastructure of contracting organizations that produced these leaps was knitted together through frequent visits of IPTO personnel to contractor sites, organized meetings of contractors, complementary projects at different sites, consulting arrangements between IPTO and contractors for dissemination of results, and large long-term contracts. Through the funding of a few centers dedicated to research and the training of computer professionals, research results and new technologies were developed and new researchers entered the field. Soon these professionals were training the next generation of computer scientists and engineers and contributing markedly to new, faster, more powerful computer systems and software. IPTO guidance and funding contributed markedly to this phenomenon. At the IPTO-supported institutions, these objectives produced a very significant correlative accomplishment: the building of strong educational programs in computer science and engineering that have been continuously among the top programs in the world.

**The second general area was IPTO's support of R&D that produced results of generic quality**, results that could be used in any computing system for many purposes regardless of the nature of the organization. The technical leaps produced by IPTO and the research community it supported over the twenty-five years of this study included the rapid development of time-sharing, wide-area networking, internetworking, interactive graphics, distributed computing, VLSI design systems, natural language communication systems for use with

computers, and expert systems. The R&D programs produced broadly relevant results that found their way into military *and* civilian systems. The public reputation of IPTO rests on technical accomplishments that resulted from IPTO funding.

**The third general area was IPTO's transfer of new technology to the military.** Transfer occurred in two ways. First, there were interactions between IPTO staff and service R&D departments. Second, IPTO used experimental testbeds, made in conjunction with the military services, to show the operation and usefulness of IPTO's research results. The subsequent construction of operational systems for the services was done by industry. The testbeds and operational systems altered the way military staffs interact with computers and improved integration and analysis needed in military situations. Military $C^3$ systems in the 1990s are thoroughly integrated systems based on the technical developments that resulted from IPTO-supported research. The 1991 Gulf War was an illustration of this $C^3$ achievement.

IPTO played a substantial, maybe even a decisive, role in the development of computer science and engineering in the period from 1960 to 1985. IPTO achieved its results through a sustained, coherent program and a lean, quick-response management structure. Results of IPTO projects changed the style of computing and stimulated basic research programs in universities and corporations. These programs helped to change computer science from a marginal program, loosely associated with either mathematics or electrical engineering, into a full-fledged discipline with its own theoretical and experimental components. IPTO promoted the transformation of the computer science field, provided the support for several important educational programs that led to significant personnel contributions needed in all areas of the field, and through the development of enabling technologies in computing and its encouragement of industry contributed to advances in and growth of the computer industry.   □

# Director
# Charles Babbage Institute
A Center for the History of Information Processing
University of Minnesota

The University of Minnesota seeks a Director for its Charles Babbage Institute (CBI). The Director will also hold the Engineering Research Associates, Inc., Land-Grant Chair in the History of Technology. CBI is a contemporary history and archives center which focuses on the history of information processing since 1935. The CBI mission is to conduct historical research and to preserve and make accessible records for use in research.

The role of the director includes leadership in CBI, scholarship and publication, and fund raising. Qualifications include a record of research, teaching, and publication suitable to be appointed as either an Associate or Full Professor in an engineering, mathematics or physical science department of the Institute of Technology and to the graduate faculty of the Program in the History of Science and Technology; administrative experience suitable to direct an institute of the size, quality, and orientation of CBI; ability to work with the community of interest to CBI; and a record of fund raising.

Applications should include a curriculum vitae, sample publications, and the names of three individuals as references. Please submit a nomination or application by the closing date of January 15, 1993 to:

Chair, Search Committee for the Director of CBI
Office of the Dean, Institute of Technology
University of Minnesota
117 Pleasant Street S.E.
Minneapolis, MN 55455

*The University of Minnesota is an equal opportunity educator and employer.*

# Adelle and Erwin Tomash Fellowship in the
# History of Information Processing 1993-94

The Charles Babbage Institute is currently accepting applications for the Adelle and Erwin Tomash Graduate Fellowship, sponsored by the Charles Babbage Foundation, to be awarded for the 1993-1994 academic year to a graduate student whose dissertation will address some aspect of the history of computers and information processing. Topics may be chosen from the technical history of hardware or software, economic or business aspects of the information processing industry, or social, institutional, or legal contexts of computing.

There are no restrictions on the venue of the fellowship. It may be held at the home academic institution, the Babbage Institute, or any other location where there are appropriate research facilities. The stipend will be $10,000 plus an amount up to $2,000 for tuition, fees, travel to the Babbage Institute and relevant archives, and other approved research expenses. Priority will be given to students who have completed all requirements for the doctoral degree except the research and writing of the dissertation.

There is no special application form. Applicants should send biographical data and a research plan. The plan should contain a statement and justification of the research problem, a discussion of procedures for research and writing, information on availability of research materials and evidence of faculty support for the project. Applicants should arrange for three letters of reference, certified transcripts of college credits, and GRE scores to be sent directly to the Institute. There is no special application form.

Complete application materials should be received by January 15, 1993. Send materials to:

Charles Babbage Institute
University of Minnesota
103 Walter Library
117 Pleasant Street S.E.
Minneapolis, MN 55455, U.S.A.
Telephone 612/624-5050.

Technology program of the University's Center for the Development of Technological Leadership. From time-to-time he participated in the teaching programs of the Department of Computer Science and the H. H. Humphrey Institute. Norberg has served on numerous examining committees for students in programs across the campus from architecture to science policy, and served on a number of faculty and university

*"[Norberg] led the Charles Babbage Institute in an exemplary fashion in his ten years as director, building it up to an internationally acclaimed resource."* *Gordon Beavers, Dean of the Institute of Technology, University of Minnesota*

committees. One of the most significant committees was the University Senate Committee on Computing and Information Systems, which he chaired for two years.

While director, Norberg also contributed to many other activities around the nation. For five years he was a member of the NASA Advisory Council, a group of approximately 25 people from industry and academia who serve as advisors to the head of NASA. Simultaneously, he was chair of the NASA History Advisory Committee, a committee of the Council to advise on NASA's history program. He chaired a year-long study of the programs and priorities of the History of Science Society. In a similar vein, he served as a member of a Review and Assessment Committee to evaluate the past and future of the

Commission of Preservation and Access, a national group dedicated to improving the preservation of endangered library materials. He served on panels for the NSF and the NEH to evaluate proposals for research grants and served in various editorial capacities for the Annals of the History of Computing and Technology and Culture. Norberg also assisted in the launching of a new technology education center in Minneapolis called "The Works."

Norberg had made CBI what it is today, a leading historical and archival center known, admired, and respected world-wide, while at the same time it has become a valued part of the University of Minnesota community. With this sound footing, CBI is prepared to continue its mission and to tackle the new challenges that lie ahead. □

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