I'm extremely excited and grateful for this once-in-a-lifetime opportunity to serve as The Computer Museum History Center's new Executive Director and CEO. We have an important dream — to preserve and present the artifacts and stories of the information age — and a rapidly unfolding plan to make it a reality.

Our strategic advantages not only go beyond our growing, world-class collection of artifacts but also include people who make daily commitments of energy, time, and money. We have the best staff, volunteers, Board of Trustees, and donors of any organization I’ve ever seen!

We have made great strides in the last few months. Over 200 supporters attended our gathering on May 3rd at the Visible Storage Exhibit Area, and I hope you have seen the great press coverage we have been attracting (e.g., SF Examiner, May 12, 2000, “Bits of History”). We are now an independent 501(c)(3) non-profit organization; the Board has added several new dynamic members (list on opposite page), and our staff is growing to meet your needs.

A NEW VISION

I have developed a set of priorities and tasks all aimed at moving the Museum forward as the authoritative and world-recognized reference for computer history. These priorities include:

PEOPLE — the individuals who make the museum tick: Board, donors, staff, scientists, hobbyists, volunteers, and people interested in computing history.

INNOVATION — the technologies, ideas, and systems to make a revolutionary new class of museum that will capture computing’s past, present, and implications for the future.

COMMUNITIES — the organizations, institutions, societies, and groups that will become our partners in building a persistent collaborative network for the longer term.

OPERATIONS — the principles, policies, technology, and people to operate a world-class museum ecosystem that will exceed all your expectations.

There’s so much more to be done, but I know you can tell we are swiftly moving the museum into its next phase! This translates into a call to help in various ways: 1) Take the time to get involved - as a volunteer, innovator, contributor, donor, or lecturer — in capturing, preserving, and organizing history; 2) Help us spread the word about our mission, and encourage others to get involved; 3) Give us your ideas, concerns, and suggestions; 4) Carefully consider contributing to the strong financial base we need each year to operate, and to our capital and endowment expectations.

Again, thanks for your help — we will always need your help. You’ll hear from me often as we build this new architectural dig are being documented for the world.

John C Toole
Executive Director & CEO
The unloading crew smiled with relief as four 18-wheelers carrying 100,000 pounds of computing history rolled to a stop in front of Building 126 (a warehouse located at NASA’s Moffett Field in Mountain View, California). The group was waiting to unload machines, artifacts, documents, photographs, journals and other memorabilia—all bearing witness to the extraordinary history of a most amazing intellectual revolution.

These were not ordinary workmen. In several cases, these very volunteers were developers and users of the mainframes, processors, operating systems, and languages that comprised the collection they were about to move into a Visible Storage Exhibit Area at Moffett Field. This was an important step forward for The Computer Museum History Center that had been established in 1996 in Silicon Valley as the West Coast branch of The Computer Museum in Boston, Massachusetts.

Gordon Bell, Gwen Bell, and Len Shustek stood at the forefront of this effort. Shustek, a staunch advocate for preserving computing history, currently serves as the chairman of the Board of Trustees. Gordon Bell, senior researcher at Microsoft, former VP at Digital Equipment Corporation, and recipient of the National Medal of Technology, and his wife, the visionary Gwen Bell, were the force and drive that had brought The Computer Museum into being over 15 years ago and helped guide it through its amazing development and growth.

IN THE BEGINNING

Gwen Bell remembers how it all began. The concept of a computer museum developed while Gordon Bell, then a professor at Carnegie Mellon University, wrote his classic Computer Structures with Allen Newell in Pittsburgh in the late 1960s. As Gordon researched diverse information processing systems, he “began bringing back artifacts. Soon, office and home were filled with modules [of early computers], memory devices that predated the core, and calculators that preceded computers.”

When the Bells returned to the Boston area so Gordon could run engineering for Digital Equipment Corporation, they needed space for their collection. DEC bought a former RCA building with “a grand lobby and open balcony waiting to be used for exhibits,” recalls Gwen. The Digital Computer Museum opened in September 1979.

The museum’s focus to an international scope. In 1983, a major gallery exhibit devoted to “The Pioneer Computer Timeline” was created, based on a lecture series initiated by Gordon Bell. Speakers included Maurice Wilkes (EDSAC), George Stibitz (Bell Telephone Relay Computers), and John Vincent Atanasoff (pioneering Atanasoff-Berry Computer). A videotaped archive of the series, as well as artifacts such as the Whirlwind, contributed to the integrated exhibit. The Timeline described specifications and gave overview descriptions for each machine in the exhibit. It was Gordon’s intent that “the timeline put the pioneer computers in their historic perspective.”

PRESTIGIOUS PARTNERSHIPS

In 1988, the Museum signed a collaborative agreement with the Smithsonian Institution’s National Museum of American History. The joint arrangement was with the Division of Computers, Information and Society, whose scope encompassed historical research, preservation, and exhibition. The Computer Museum developed a common catalog and a database of both collections, with the goal of preserving all important artifacts.
The Digital Computer Museum’s first public event was a lecture on the EDSAC by Maurice Wilkes.

According to John Toole, newly appointed Executive Director and CEO of The Computer Museum History Center, “Our goal is to develop a world-class center where scholars, researchers, and hobbyists can explore, contribute to, and appreciate the important events and discoveries in the timeline of the information age. Our collection of the stories and artifacts of past innovators will become an outstanding showcase for the future.”

As Boston Computer Museum’s Executive Director Oliver Strimpel once wrote, “The perspective of history casts into sharp relief the astonishing technological changes over the past 50 years of computing. Thus, through preservation, the Museum gains an ability to inspire its visitors…”

In addition to the staff of the Silicon Valley site, the growth of The Computer Museum History Center is aided by a cadre of dedicated volunteers, including Dave Babcock, Lee Courtney, Charlie Pfefferkorn, Elizabeth (Jake) Feinier, and Ed Thelen. Courtney, CEO of Monterey Software Group in Mountain View, stands ready to unpack and set up the new displays. “What the Museum is doing is very important. We really are at the cusp of the information revolution, both with new computers and a history that goes back 50 years. The Museum is capturing this ongoing history and its impact on society.”

And, concludes Trustee Chairman Len Shustek, “...we want to build the world’s most comprehensive center for the study and research of computing history — creating the industry’s center for the technical history of computers, and becoming a specialized and significant center for technical visitors from around the world.” He further believes that we are “responsible to provide universal access, freedom from censorship, efficient searches, clever organization, fair intellectual and commercial property rights, and unlimited archival storage — all in a way that makes economic sense.”

Fortunately, with its professional, lay, and volunteer leadership, The Computer Museum History Center stands poised to meet this challenge in an exciting and successful way. All who are interested are invited to join us as we implement our vision for the future.

The Museum also enjoyed other collaborative relationships with the Scientific Instrument Commission of the Union Internationale d'Histoire et de Philosophie des Sciences, the Science Museum in Kensington (United Kingdom), and the Deutsches Museum in Munich (Germany). According to Gwen, “One of the goals of The Computer Museum [was] to show that computer innovations are not unique to any one country, any one company, or any one institution.”

A WORTHY INHERITANCE

Having established a landmark framework for the preservation of the history of computing, the Museum entered a new phase in 1996 with the establishment of The Computer Museum History Center in California. The Boston site continued to emphasize exhibitions while the Silicon Valley organization developed and maintained the archival collections.

A few years later, The Computer Museum in Boston relinquished its exhibition space on Museum Wharf, consolidating its displays under the roof of Boston’s premiere Museum of Science. The remaining half of its collections traveled to Moffett Field in February 2000, adding significantly to the archives of the History Center. In 1999, The Computer Museum History Center became an independent entity and is now moving forward with its mission to “preserve and present for posterity the artifacts and stories of the information age.”

The Computer Museum History Center currently features a “Visible Storage Exhibit Area,” a warehouse space which houses artifacts and other pieces of the History Center’s extensive collection. The Museum also conducts a well-respected lecture series and is developing a sophisticated restoration program. One of its first projects involves restoring an early IBM 1620 machine to full operation.

Today, the Museum boasts more than 3,000 computer artifacts, 1,000 films and videos, 5,000 photographs, as well as several thousand linear feet of catalogued documentation and gigabytes of software. All this material now awaits a new home in a multi-million-dollar museum, storage site, and research center that will be built within the next three to five years.

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Fortunately, with its professional, lay, and volunteer leadership, The Computer Museum History Center stands poised to meet this challenge in an exciting and successful way. All who are interested are invited to join us as we implement our vision for the future.
The year 2000 has been action-packed so far and I certainly believe that there is no stopping us now. Engaging the creative, competent, principled leadership of John Toole is a real coup, and the Museum is already benefiting from his presence. If the Museum offered stock I’d be buying it up, because this organization is a definite winner. Board, staff and volunteers continue to pull together here to create wonders — the drive, stamina and collective abilities are phenomenal. Numerous developments of late have furthered the Museum’s mission to preserve and present the artifacts and stories of the information age. Here are just a few:

**Gray-Bell Archive**

A central part of the Museum’s mission is to present personal stories and perspectives behind important computing developments. In pursuit of this goal, the Museum recently instituted the Gray-Bell Archive, supported by computing industry pioneers Jim Gray and Gordon Bell. “What we have in mind with this archive is to capture views of the pioneers and various aspects of computing,” says Bell, a Museum trustee.

As part of the Gray Bell Archive, the Museum was able to acquire the extensive University Video Communications (UVC) collection, containing nearly 200 video presentations by computing legends such as Alan Kay, Donald Knuth, John Backus, Carver Mead, and many others. Many contain information not recorded elsewhere.

With the addition of the UVC collection, the Museum’s video and film archive now includes 1,000 titles. Some of these are both viewable online and available on videotape at a nominal charge for classroom, professional or personal use. Visit our website for details, or call Karyn Wolfe at +1 650 604 2570.

**Donor Notes**

Last December, Trustee John Shoch challenged donors to join him in becoming a Core Supporter. He asked donors and friends to show their continued commitment to the Museum by making gifts between $1K ($1,024) and 64K ($65,536). During the challenge period, more than 60 supporters made contributions totaling $510,000. On February 10, Gordon and Gwen Bell opened their home in a private reception for these Core Supporters, including Gordon & Betty Moore, Gene & Marian Amdahl, and Arthur & Toni Rock (page 12). We thank everyone who contributed to this appeal.

The Museum is now completing its drive for the fiscal year ending June 30, 2000. Please join us and support our mission to preserve the artifacts and stories of the information age by becoming a Core Supporter today!

Since many supporters pay their annual memberships and make donations through gifts of appreciated stock, we have made it even easier to give. Morgan Stanley Dean Witter is now handling the Museum’s stock transfer plan. Here is the account information:

FBO: The Computer History Museum Center, DWR Account # 112-014033-072, 245 Lytton Avenue, Suite 200, Palo Alto, CA 94301-1963, DTC #015. Simply contact Matthew Ives at Morgan Stanley Dean Witter, +1 650 853 4072 or Eleanor Dickman at the Museum, +1 650 604 2575.

**Computer History Lectures**

Over 100 people came to hear **Beowulf-class PC clusters: An Historical Perspective** featuring Thomas Sterling of NASA JPL, and the California Institute of Technology on April 13. Prof. Sterling revealed the motivation and importance of Beowulf-class computing, its hardware and software elements, and its history – from inception of 16-processor systems, to present day systems of up to 1,000 processors and more.

**Early Computer Crime** on March 23rd attracted over 300 people who experienced the rare opportunity to hear inside stories from those who have been at the heart of identifying, reporting on and protecting against computer crime. Presented in the wake of the “denial of service” attacks this past spring, panelists — including Whitfield Diffie, distinguished engineer at Sun Microsystems; John Markoff, technology writer for *The New York Times*; Peter Neumann, principal scientist at SRI International; and Cliff Stoll, astronomer and story-teller — reminisced and discussed the nature of computer crime with an energetic audience. SRI alumnus Donn Parker of Adario provided the introduction. A reception gave attendees a chance to interact with the speakers and explore the Museum’s artifacts.

**Recollections of Early Paint Systems**, presented on January 13, featured Dick Shoup and Alvy Ray Smith relating stories of their early adventures in pixel graphics and the development and use of SuperPaint, the world’s first paint program. Over 100 people attended the lecture and were entertained by stories and re-creations of some of the earliest computer graphics.
Volunteer Notes

The Computer Museum History Center relies on a unique set of dedicated volunteers — and we have some of the best. From college students to CEOs, our volunteers donate their time and talents to preserve computing history. Recently, Museum volunteers have:

- Prepared our newly added 13,000 sq. ft. auxiliary warehouse to safely store more artifacts
- Unloaded four tractor-trailer loads of artifacts from the DEC historical collection donated by Compaq and two lots of artifacts from The Computer Museum at the Museum of Science in Boston
- Prepared 5,000 sq. ft. of additional exhibit space
- Created exhibit displays
- Catalogued hundreds of artifacts
- Donated countless hours and expertise

There are a number of volunteer opportunities and countless ways to get involved:

- Helping arrange, catalogue, clean, and photograph artifacts
- Preparing for and staffing lectures and other events
- Assisting with projects in our administrative offices
- Engaging in specific projects geared to individual expertise and talent, including a current need for sheet metal fabrication for the IBM 1620 Restoration Project

We are defining a number of exciting new volunteer projects that require help. If you would like to volunteer to make a difference, contact our volunteer coordinator Lee Courtney (courtney@computerhistory.org). He is a volunteer himself and can help you get involved.

Volunteer Charlie Pfefferkorn: Master of Space and Time

As with most non-profit organizations, a group of dedicated volunteers helps leverage the work of the staff. The contributions of our volunteers include physical plant improvement, curatorial assistance, exhibit construction, restoration, and research. One of these great volunteers is Charlie Pfefferkorn.

Working with Dag Spicer, the Museum’s Curator, Charlie is responsible for planning and organizing the Museum’s complicated storage needs. He analyzes the requirements, creates detailed diagrams, and then helps supervise the placement of the artifacts. He volunteers on a weekly basis.

Charlie helped to mastermind the effort to absorb the recent tidal wave of donated artifacts at the Museum. He planned and helped execute critically important projects, such as relocating a large part of the collection and receiving the Digital Historic Collection, a massive donation by Compaq of 1000+ artifacts transported in four tractor trailers. We’re very lucky to have someone as talented and dedicated as Charlie Pfefferkorn, who has rightly earned the title, Master of Space and Time at the Museum!

As a volunteer, Charlie appreciates the chance “to see and work with the various artifacts that define the history of computing.” He meets people who have participated in the development of computing and gets to know volunteers with “interesting backgrounds and lots of neat stories” who are making a “significant contribution” to bringing “computer history alive.”

Charlie earned a PhD in computer science from Carnegie-Mellon University and was a faculty member at Purdue University. Interestingly, his PhD thesis was in artificial intelligence, focusing on using the computer to design room layouts containing equipment or furniture. His interest in space and storage has thus persevered over the years and now benefits the Museum.

Since arriving in the Silicon Valley over 25 years ago, Charlie has worked for several companies in various technical, managerial, and consulting roles, including working with the ILLIAC IV and other computing projects at NASA Ames. He is also actively involved in the Software Development Forum in San Jose, where he serves as a member of the Executive Council and as co-chair/founder of the International Software SIG. He is also a Visiting Fellow and “Pubmeister” for the Silicon Valley World Internet Center.

Lee Courtney is also a volunteer and the volunteer coordinator at The Computer Museum History Center.
I. 100 TIMES FASTER

In a famous memo dated October 25, 1954, Dunwell wrote: “The Datatron program is intended to assure IBM a preeminent position in the field...” and will “take a giant step and make substantial advances on all fronts.” A team of senior IBM technical and management staff met to consider building what John von Neumann had earlier exhorted them to create: “the most advanced machine... possible in the present state of the art.” Besides allowing IBM to leapfrog out of the antiquated vacuum tube technology and into the fast-moving computer world, Stretch would also allow IBM to unify its various computer products, including the monumentally successful System/360 product line — become evident. Dunwell was made an IBM Fellow that year, the company’s highest honor.

A SUCCESSFUL FAILURE

The Stretch story is only one of many in the history of computing that shows how triumphs are built upon the ashes of “failures.” Stretch is one of the hallmark machines — despite its near invisibility to history — that defined the limits of the possible for later generations of computer designers. One way you may recognize many Stretch innovations in present-day products:

- Multiprogramming
- Memory protection
- Generalized interrupt system
- Paging
- Memory interleaving
- Speculative execution
- Lookahead (overlap of memory and arithmetic ops)
- Concept of a memory bus
- Coupling two computers to a single memory
- Large core memory (1MB)
- The eight-bit character (the “byte”)
- Variable word-length
- Dual 64-bit Interface

Ironically, microprocessor companies 20 or 30 years later “re-invented” most of these innovations. The Computer Museum History Center has parts of the original Stretch machine (serial number 1) from Los Alamos and a complete Stretch (minus core memory unit) from the Lawrence Livermore National Laboratory.

II. THE NEWS SPREADS

The first machine (officially named the IBM 7030) was delivered to Los Alamos on April 16, 1961. Although far short of being 100 times faster than competing machines, it was accepted and ran for the next 10 years, with the then-astonishing average reliability of 17 hours before failure.

While customers were generally happy with the machine’s performance, internally, Stretch was considered a failure for not meeting its speed benchmark. IBM reduced the price from $13.5 million to $778 million, thus guaranteeing that every machine was built at a loss. Dunwell’s star within IBM fell dramatically, and he was given fewer responsibilities.

As time went on, however, attitudes within IBM changed. From a lagging position in industry, IBM had moved into the forefront through the manufacturing, packaging, and architectural innovations Stretch had fostered. Dunwell’s exile ended in 1966, when the contributions Stretch had made to the development of other IBM machines — including the monumentally successful System/360 product line — became evident. Dunwell was made an IBM Fellow that year, the company’s highest honor.

III. THE FASTEST WAY TO SUCCEED IS TO DOUBLE YOUR FAILURE RATE.

In the early to mid 1950s, IBM and UNIVAC, the only two large companies building computers, were considering the use of transistors in their products. Though the transistor effect had been discovered in 1947 at Bell Labs, vacuum tubes remained commonplace in computer hardware, while American manufacturers struggled to make a reliable, mass-producible transistor.

Today it may seem surprising that IBM was undergoing tremendous turmoil about its role in the new field of computers. However, the public had begun to associate the UNIVAC name (not IBM with computers. CBS’s 1952 election predictions predicted Eisenhower’s victory. And, when former IBM customers started assigning key contracts to UNIVAC, IBM’s future was in doubt.

Steve “Red” Dunwell and Werner Buchholz, two senior IBM engineers, proposed a new machine, code-named “Datatron.” Based on transistors, the machine would enable IBM to leap ahead of UNIVAC and would embody many new architectural concepts.

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The Computer Museum History Center. Your donation will help preserve the artifacts and stories of the Information Age for future generations.

YES, I want to help save computing history. Please process my donation at the level indicated below. I look forward to learning more about the programs and activities of The Computer Museum History Center, especially its plans for growth in the coming years.

Enclosed is my check payable to: The Computer Museum History Center

I prefer to donate securities. Please contact me.

Charge my Visa Mastercard

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Thank you for joining our network of supporters. We look forward to getting to know you!
"CONSUL," THE EDUCATED MONKEY is a simple mechanical calculator made of movable sheet metal parts and a multiplication table insert. When pointing the monkey’s feet at a pair of numbers, Consul points to the result in the pyramid of numbers between his hands. By sliding in an “addition table,” Consul can also be made to add by the same principle. The calculator was patented on June 27, 1916, by William Robertson, of Belmont, Ohio, and the invention assigned to the Educational Novelty Company of Dayton, Ohio. Consul’s packaging states: “It makes no difference to the monkey whether children are bright or stupid. He never loses patience at having to answer their questions.”

From the permanent collection of The Computer Museum History Center.
“CONSUL,” The Educated Monkey (1916), XB302.84, Gift of Gwen and Gordon Bell

WHAT IS THIS?

This item will be explained in the next issue of CORE.

Please send your best guess to mystery@computerhistory.org before 7/15/00 along with your name and shipping address. The first three correct entries will receive a free poster:

25 YEARS OF MICROPROCESSOR EVOLUTION