

The Computer Museum

300 Congress Street
Boston, MA 02210

(617) 426-2800

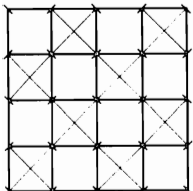
MEMO

to: The Computer Museum Exhibits Committee
from: Oliver Strimpel
re: meeting with Richard Fowler
date: August 1 1988

As you know, Richard Fowler who is head of design at the National Museum of Photography, Film and Television at Bradford, England will be visiting the Museum August 2-16. His task is to produce a masterplan for the exhibit spaces, as well as some renderings that will help promote the concepts to potential funders.

I enclose a preliminary list of constraints that he should follow. Please add/delete and ammend as you see fit, and come with your thoughts to the next Exhibits Committee meeting to meet Richard.

To remind you, the meeting will be at the Museum from 3 to 5pm next Monday, August 8. Also, please don't forget the exhibit 'sales' meeting/party which will take place at Gwen's apartment starting at 6pm on Monday August 15.



CONSTRAINTS FOR THE PREPARATION OF A MASTERPLAN FOR THE COMPUTER MUSEUM EXHIBIT SPACES

The following constraints should be considered in conjunction with the more detailed exhibit planning documents of 6/7/88 and the 'infill' document of July 1987.

1. The Museum will develop a distinct exhibit area devoted to computer history. This will feature a few important artifacts, and will concentrate on milestones. It will probably require no more than a small bay (2,500 sq ft). This exhibit should be accessible from the entrance, so that visitors could choose to see this first.
2. The Museum will develop an exhibit devoted to explaining how computers work. Ideally, this too would be located near the entrance, but this is not essential.
3. Bays 3,2 and 1 on the 6th floor are available for exhibits. They should probably be developed in that order, so as to be linked to exhibits that are already open, and to retain the visible storage area in bay 1 as long as possible.
4. Visitors need to know where they are; there is progressive disorientation as they get further from the elevator, especially on level 5. The problem needs to be addressed either by altering the layout, or by signs, or both.
5. The entry bay requires special attention. Firstly, a welcoming feature needs to set the tone for an exciting and entertaining visit. Visitors should be able to discover what they there is in the Museum. There needs to be a new layout to accomodate groups of arriving visitors. The possibility of an introductory theater needs to be addressed. The SAGE exhibit needs to be upgraded in the short term; it could be removed in the long term.
6. The least successful of the current exhibits: SAGE on the 5th floor, See it then Theater, Cray, Personal Computing, Manufacturing and Honeywell Animals should be replaced soonest. The current division of these areas into exhibit spaces is not very successful.
7. The circulation pattern for visitors when the whole of the 6th floor is open needs to be considered. Options include installing a second

staircase between the 5th and 6th floors. In addition, the two elevator exits - (5th and 6th floors) could be used differently.

8. The office, auditorium, storage and workshop locations are not set in stone. One day, the Museum might add another floor on the roof, and the offices and/or the auditorium might move upstairs. However, this is certainly not on the cards in the short term (5 years).
9. Some attempt should be made to unify the style of the lobby and elevator with the exhibits on the 5th and 6th floors.
10. Drywalls are not sacred; they can be torn down, or moved. However, significant changes can not be made to any brick walls.

OS

8/1/88

Exhibits

Academic - Current H * → Jim McKinney
History H * → IB Cohen

Industry - Historic → Sam Fuller
Current H * → Dave Nelson

Education
Museum

H ** → Bob Luckey

Ed Fredkin

Doug Dratne

B ** → Emerson Pugh / Charlie Bask

→ Cores

B ** → Sherry Turckle

B ** → Steve Wosniack

Bell
Collections Committee

Jean Sammet
Brian Randell
Smithsonian

Jack Keeler Exec VP IBM
all prod. dev. & mfg. - is the
right IBM guy according to
Naomi Seligman - is hot on IBM's
contribution to technology

Computer Museum Exhibit Development Plan

Rev 1 - 7/15/88

Purpose of the Exhibits

Funding Strategy

Where the \$ Come From?

The exhibits will be self funding

sources: companies

individuals - who specifically
want to fund exhibits

professional associations

government & foundations

Limitations on company promotion in exhibits

The Museum will be sensitive to the interests of
the funder but will be the final authority on the
content of the exhibit and the use of the company
name and logo.

Allocation of Exhibit Space by Content

Historical - Where Computers Came From

a summary exhibit on the evolution of computer
hardware and software

a history gallery filled with historical computers
(at the back of the museum)

How Computers Work

a specific exhibit such as Oliver's giant computer
or worked into other exhibits where
appropriate?

Biographical - People in Computing

multiple people at once

Example: Seymour Cray

Theme Exhibits - How Computers Are Used

Examples:

smart machines

pc's

graphics

networked society - computers we never see
which control information in our society

American Airlines reservation system
telephone system
on-line banking -cash dispensing machine
stock quotation system - Lotus signal
supermarket checkout

ubiquitous computers - computers we never see
which control machines we use every day

Ford car
telephone
microwave oven
dishwasher

Layout of Exhibit Space

Ground Floor Entrance

What the visitor sees first

The summary exhibit on the history of computing?

Priority should be given to replacing unsuccessful
exhibits with new exhibits rather than developing
unused space?

Schedule of Exhibit Development

It is the Museum's objective to open one major new
exhibit per year

SIGGRAPH 88 Trip Report

Every year, computer graphics professionals and enthusiasts from all over the world congregate at the ACM SIGGRAPH conference. I attended the conference in '84 and '85. The following is not an overview of this year's conference, but a summary of aspects relevant to the Museum.

The Interactive Image

This is a series of hands-on exhibits produced in Chicago by Tom DeFanti and his lab for the Chicago Museum of Science and Industry. It was on display in the SIGGRAPH art show. The Museum has agreed to take several of these exhibits for display here. SIGGRAPH is offering us a \$20,000 grant to ship them here, and modify and install them. There will be physical changes needed to make the 'kisoks' they are mounted in smaller, and also software changes to make the exhibits more effective.

Tom DeFanti collared a couple of his students, and they are being driven up to us, arriving today! They will go into Bay 3 temporarily. When they are ready to go out, they will probably go in Bay 2 where the ILLIAC IV and Apollo guidance computers are.

The Film Show

The highlight of the conference is always the computer animation film and video show. The greatest new material is always premiered there. There were several excellent items this year. I have compiled a list. There is plenty of good material for updating the animation theater.

The Teapot

The Museum is famous among this crowd for owning the Teapot. Many people spoke to me about it, curious as to what it is actually like, etc. I think we should definitely use the fact that SIGGRAPH is in Boston next year to do a first rate new exhibit based on the teapot. Please all join me in putting out the word for volunteer programmers.

Educational Films at the Museum

Two of our future exhibits may well make extensive use of first-rate computer animation. The first is 'How a Computer Works', in which a film will be need in conjunction with 3-dimensional spaces. In addition we may need a film on computer history. The idea of doing such films has come up at the Exhibits Committe meetings. Almost certainly the best educator using the medium of computer graphics is Jim Blinn. He has done a great deal of animation, most recently for the telecourse "The Mechanical Universe". I spoke to him about our ideas in the abstract, and he said he'd be happy to help however he could. He'd be a terrific person to coopt for these films.

The Exhibits

SIGGRAPH has a giant trade show. There were some spectacular demos of new products. In particular, Ardent and Stellar showed of their products with impressive demos.

I saw a very convincing demo of 3D imaging using a Sun with an accelerator (TAAC-1) and a Tektronix polarizing screen. The viewer wears polaroid spectacles to see the effect. This could be used with our spare Sun, and an add-on from Sun that their manager at the show thought they could probably donate. Tektronix may continue to donate to us. 3D imagaing is conspicuously absent in the graphics gallery today.

Another nice demo was a milling machine attached to a Mac II with CAD/CAM software. I've always wanted to show the way CAM works by actually making something on the floor.

Silicon Graphics was showing a flight simulator actually mounted inside the cockpit of a small plane. This was a nice display technique, definitely adding to the excitement of using the program. It was still possible to look in from the side over the 'pilot's' shoulder. I hope we'll be able to make Silicon Graphics' promise to give us a couple of machines come true on day.

HP have hardware that computes diffuse light in images (using radiosity) - it make pictures look much more realistic.

For the most part, the exhibit was just a large space of colossal MIPS, MegaFLOPS, polygon renderings per second, and other specs, delivered at ever lower costs.

The SIGGRAPH Executive Committee Meeting

I showed up to represent the Museum, and was called on to speak about both the History Project and The Interactive Image. They are making a lot of money this year again (about \$1.5m) and continue to need to spend it on worthy causes...

Technical Program

I attended some interesting panel sessions - I'd be happy to talk about them to anyone interested. I also have the proceedings and the film show and art show catalog. The latter is partially on a 1/2" video tape.

SIGGRAPH 89 Art Show

Gwen and I had breakfast with Mark Resch, who is doing the art show next year. He will be visiting us this week to talk about where it might be housed. He is enthusiastic about having the show here; it could be up for the months of July and August. This is something of a coup, as it is very rare that the art show is in a separate location from the conference itself. The quality of art at this year's show was mixed, but I think it is certainly good enough for a temporary show. This year there were about 5 interactive pieces apart from The Interactive Image. We need to have a meeting to discuss the art show next year, as well as other aspects of next year's SIGGRAPH.

Oliver Strimpel
8/8/88

Computer Museum Exhibit Development Plan

Purpose of the Exhibits

Funding Strategy

Where the \$ Come From?

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~~primary~~ source: companies

~~secondary sources~~ individuals, professional associations
governments & foundations

who specifically want to fund exhibits

Limitations on company promotion in exhibits

The Museum will ^{be sensitive to} consider the ~~promotional~~ interests of the funder but will be the final authority on the content of the exhibit and the use of the company name and logo.

Allocation of Exhibit Space by Content

Historical - Where Computers Came From

a summary exhibit on the evolution of computer hardware and software & then a history gallery loaded with stuff.

WEBIT
Stamford
HP City
film theater

How Computers Work

a specific exhibit or worked into other exhibits where appropriate? ^{Oliver's giant computer.} people don't care how a car works

why you want computers to be small

Biographical - People in Computing

Examples: multiple people ~~being~~ at once

Seymour Cray

Theme Exhibits - How Computers Are Used

Examples:

Smithsonian exhibit about \$6M

smart machines

pc's

graphics

networked society - computers we never see
which control information in our society

American Airlines reservation system
telephone system
on-line banking -cash dispensing machine
stock quotation system - Lotus signal
supermarket checkout

ubiquitous computers - computers we never see
which control machines we use every day

Ford car
telephone
microwave oven
dishwasher

Layout of Exhibit Space

Ground Floor Entrance

What the visitor sees first

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SOME ALTERNATIVES TO PRESENTING HISTORY AT THE COMPUTER MUSEUM

- A Permanent Exhibit on the History of Computing Tracing the Major Benchmarks from Babbage to the Present -- incorporating an historical "point of view", using the Museum's collection and reflecting our international mission.
- Incorporating history into thematic exhibits -- sugar coating the history pill. Examples include
 - the Timeline and Robot Theatre in Smart Machines;
 - the glimpses at history in the Image Gallery (the cases of input and output devices, the historic video tapes etc.);
 - doing a timeline of people and events that lead to personal computers as part of the Personal Computer Exploration Center;
 - flashbacks to the origins of the SABRE and other large scale systems in the Networked Society;
 - incorporating the invention and benchmarks in the development of chips in Ubiquitous Computing.
- Providing an introductory film on the history of computing incorporating an historical "point of view" and incorporating very short portions from the Museum's film, video and photo collection. Offering a longer introductory film version for use in the classroom before and after visits and shown occasionally in the auditorium.
- Improving the Visible Storage Area with signs and safeguards so that it could be opened on a regular basis, e.g., one day per week.
- Encouraging the development of special short-term historical exhibits for the Norris Gallery. Examples include
 - Computers in Your Pocket (now travelling)
 - Memory technology evolution
 - Vignettes of Great Computer Entrepreneurs
 - Winners of the Turing Award -- people and ideas,

THE COMPUTER MUSEUM EXHIBITS COMMITTEE

Meeting of July 15 1988

Agenda

- Review and discuss Exhibit Development Plan Outline
- Discussion of progress with specific exhibit plans
- Guidelines for Richard Fowler, visiting designer 8/2 - 8/16
- Next steps
- Other business

The meeting will be followed by a tour of the Museum's newly created visible storage area.

Bradford - 8:30 - 11:00 school groups
11:00 - 6:00 general public

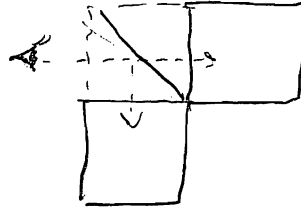
should have class rooms

multiple monitors in 5x5 array in entry way to give more

add a big sign
pizzazz

half silver nitrate & two rooms

dark room in bathroom &
separate darkroom @ Bradford



CONSTRAINTS FOR THE PREPARATION OF AN EXHIBIT MASTERPLAN

The following constraints should be considered in conjunction with the more detailed exhibit planning documents of 6/7/88 and the 'infill' document of July 1987.

1. Drywalls are not sacred; they can be torn down, or moved.
However, significant changes can not be made to any brick walls.
2. Visitors need to know where they are; there is progressive disorientation as you get further from the elevator, especially on level 5.
3. The Museum plans to develop introductory exhibits which address how computers work and computer history. Some space within easy access of the Museum entrance needs to be allocated to this. How should bay 4 be used? See item 4 below.
4. The entry bay requires special attention. Firstly, a welcoming feature needs to inform and set the tone for an exciting and entertaining visit. There needs to be a new layout to accommodate groups of arriving visitors. The possibility of an introductory theater needs to be addressed. The SAGE exhibit needs to be upgraded.
5. The least successful of the current exhibits: See it then Theater, Cray, Personal Computing and Manufacturing should be replaced soonest. The current division of these areas into exhibits is not very successful.
6. The circulation pattern for visitors when the whole of the 6th floor is open needs to be considered. Options include installing a second staircase between the 5th and 6th floors.
7. The office and the auditorium locations are not set in stone. One day, the Museum might add another floor on the roof, and the offices and/or the auditorium might move upstairs. However, this is certainly not on the cards in the short term (5 years).
8. Some attempt should be made to unify the lobby and elevator with the exhibits on the 5th and 6th floors.

The Computer Museum

300 Congress Street
Boston, MA 02210

(617) 426-2800

May 27 1988

Gardner Hendrie
342 Green Street
Northboro
MA 01532

Dear Gardner,

Thank you for taking the time to have a full discussion at breakfast last Friday.

Following our discussion of the Exhibits Committee and Jean's letter, I have sent her a reply and enclose a copy. I hope this represents things fairly.

I refrained from sending Jean a copy of the minutes of the May 9th meeting as you had not approved them. Would you like me to circulate them?

In thinking about the next meeting on June 17, I feel we might do more harm than good by making the Exhibits Committee a 'closed' meeting, especially in Jean's case. Perhaps we could invite all Board members who had the time and interest to stay on and join this meeting?

Bob Lucky was most supportive and liked "The Networked Society". He offered AT&T's in-kind support, but said the money might be difficult. However, he will initiate the process with their foundation. I said that we were asking the banks, airlines, and other bodies for \$150,000 in cash to have a share in the exhibit, and he said he would try for the same amount from the AT&T Foundation. I enclose a trip report that summarises my visit to Bell Labs and also to two other places I visited on this trip.

Are you planning to attend the June 9 3pm meeting with the DEC Contributions Committee?

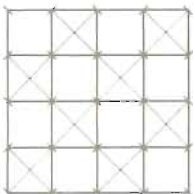
I look forward to talking with you about what we want to accomplish in the next Exhibits Committee meeting, and how we are going to maximize the benefit of Richard Fowler's (the English designer) visit during the first two weeks of August.

Yours,



Oliver Strimpel

enclosures: letter to Jean Sammet
trip report



The Computer Museum

300 Congress Street
Boston, MA 02210
(617) 426-2800

May 27 1988

Ms. Jean E. Sammet
IBM Federal Systems Division
6600 Rockledge Drive
Bethesda
MD 20817

Dear Jean:

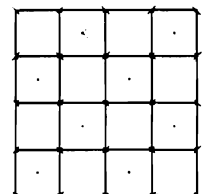
Gardner Hendrie has asked me to respond to your letter of May 9 regarding the Exhibits Committee.

Firstly, Gardner and I are in complete agreement with you that it would not be correct to select new exhibits on the basis arbitrary personal preferences of the Exhibit Committee members and the existence of funders. It was to place the selection of exhibits on firm ground that I went through the exercise of using the ACM Computing Reviews taxonomy and prepared a table that ranked exhibit ideas according to a number of different parameters. This was presented at the Board meeting on November 6 1987. However, at the Exhibits Committee meeting of March 30th, we did indeed narrow the number of exhibits under consideration. This was in response to a feeling that the Committee needed to focus on reaching critical mass on at least one exhibit rapidly in order to open one major new exhibit within 18 months of the Smart Machines opening. We felt this was very important in order to maintain visibility and attendance. It would also help provide momentum in the capital campaign and raise staff morale.

The exhibits we focussed on had survived the earlier selection process. The entry bay, Personal Computer Exploration Center and The Interactive Image (formerly "Image Gallery: Simulation") were discussed at the November Board meeting. In addition, the ideas contained within the "Ubiquitous Computers", "Information Age" and "The Chip Comes of Age" headings of November 87 evolved towards the the umbrella title of "The Computer Age", to be tackled in two parts: "The Networked Society", and "The Ubiquitous Computer". Short outlines of these two exhibit ideas are enclosed.

We do not intend to stop thinking about the big picture. Gardner feels strongly that a stable long-range exhibit plan is needed, and therefore drew up the enclosed agenda for the May 9 Exhibits Committee meeting. He felt that an important ingredient of such a plan would be the apportioning of gallery space between generic exhibits and thematic exhibits.

Generic exhibits present fundamental aspects of the subject that underly all computing. Thinking in terms of our audience constituencies, one might identify generic exhibits as covering the ground that school teachers most want their students to learn



when they visit. Looking at exhibits in this way, exhibits such as "How Computers Work" and "Software" are classified as generic. Thematic exhibits address computing in a more topical fashion, and usually contain some generic information within them. Most of our existing exhibits would be classified as thematic. "Smart Machines" and "The Computer and the Image" are good examples of a thematic treatment.

The Committee felt both generic topics and thematic exhibits should be represented, but left open the question of whether to treat the generic areas in separate exhibits or as layers within thematic exhibits. I have been asked to sketch out some ideas as to how separate generic exhibits might be presented.

I think Gardner is leading the Exhibits Committee towards the formulation of a long range plan for the exhibits. This plan will be presented and discussed by the full Board at several Board meetings until we have a clear and well-developed statement that the Board approves. The hope is that the plan would then last for much of the next phase of exhibit development and that it could be used as a powerful tool to explain the Museum to potential supporters.

I hope this addresses your points, at least in part. I look forward to seeing you at the Board meeting and hope that there will be some time for us to talk then or after the Collections Committee meeting on the previous day.

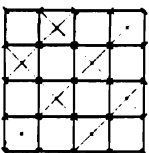
Yours sincerely,



Oliver Strimpel

enclosures: Exhibits Committee Agenda May 9
"The Networked Society" outline
"The Ubiquitous Computer" outline

cc: Gwen Bell
Joe Cashen
Dave Donaldson
Gardner Hendrie ✓
Bill Poduska



The Computer Museum

300 Congress Street
Boston, MA 02210
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MEMO

To: The Computer Museum Exhibits Committee
From: Oliver Strimpel
Re: Next Committee Meeting
Date: June 27 1988

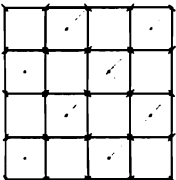
The next Exhibits Committee meeting has been scheduled from 3-5pm on Friday July 15 1988.

We hope you will be able to stay on after the meeting for a drink and a tour of the Museum's new collections visible storage area.

The minutes of the May 9 meeting are enclosed.

Gardner - American Airlines exhibit ideas enclosed.

Oliver



Minutes of the Exhibits Committee Meeting of May 9 1988

Present: Gardner Hendrie (Chairman), Gwen Bell, Joe Cashen, Bernard Cohen, James McKenny, Robert Metcalfe, David Nelson, Oliver Strimpel

How should we allocate our exhibit space?

GH introduced the notion of looking at exhibits as thematic or generic. Thematic exhibits, such as Smart Machines, The Interactive Image, SAGE, PC Exploration Center, The Networked Society and The Ubiquitous Computer present an application area or a particular type of computer usage. Generic exhibits address questions such as "How does a computer work?" and "How were computers developed?"

BC presented an overview of the Smithsonian's new exhibit. Their theme will be the nature of information; the first 1/3rd of the space will consist of a sequence of scenarios, starting with the laying of the Transatlantic Cable. Visitors will next see a reconstruction of ENIAC, followed by displays showing the emergence of the computer industry including many working examples. Some discussion of how computers work will also be included.

BC felt that three points should be conveyed with regard to how computers work: 1. Why miniaturize? 2. The difference between software and hardware 3. What is software like, what are the elements of a program? The aim is to raise awareness, not give a computer course.

RM asked whether the Museum's mission statement could guide the allocation of exhibit space. GH said that as the mission states that exhibits should educate and inspire ALL levels of the public, one could look at the space in terms of how they serve the Museum's three constituencies (computer knowledgeable, those directly affected by computers, and the young).

RM asked what we might display that could be as uniquely appealing as the world's largest tree that he recently drove 12 hours to see. OS thought an improved SAGE exhibit might come closest. DN suggested that SAGE's size be reinforced through models or other means.

GH asked whether the Museum should have an exhibit on history, including hardware and software. GB said social history should be included. JM thought this should include how the computers were used, produced, what they replaced and what effect it had on an organization.

RM suggested a list of what would not be possible without computers.

The group felt software was important, all the more as it represents an increasing portion of the computer business in economic terms. DN picked a key software development for each decade: 40's stored program, 50's autocode, 60's languages, 70's structured programming, 80's object-oriented programming.

GB asked whether "well-rounded" was the goal the exhibits should be striving toward. DN suggested a gradation, from very interactive at one end to more historical at the other. JC preferred to think of the whole set of exhibits as a system, most of which should have broad appeal. OS said visitors 'maraud', follow their own path, so that order of exhibits is less important than correct content overall.

GH asked whether space should be devoted to how computers work. RM said that this, together with what they do and where they came from are three important aspects that we should present in a lively, interactive fashion, encouraging visitors to experience success while using computers in hands-on exhibits. DN felt history was the main point of the Museum; other subjects could be learned about elsewhere. JM felt that how computers work and their history should be presented, but in the context of how they're used. The ATM was a good example. Economics should also be addressed. BC also supported both types of generic exhibit, and cited the example of the credit card.

It was felt that specific descriptions of exhibit alternatives might help the committee members decide whether the generic subjects should be addressed in separate, dedicated exhibits, or embedded in thematic exhibits.

The next meeting was planned for the afternoon of June 17 1988 immediately after the meeting of The Computer Museum Board. Max Hopper would be invited to attend.

OS 5/11/88

PLANNING THE COMPUTER MUSEUM'S EXHIBITS

The Computer Museum's mission is (in part):

To educate and inspire all ages and levels of the public through dynamic exhibitions and programs on the technology, applications and impact of computers.

The Museum is in the process of developing a long range plan for its exhibits that will serve to guide exhibit development policy through the next phase of development. Exhibit content is perhaps the most important area in which to formulate a clear policy. The mission statement requires the technology, applications and impact of computers to be covered. The Exhibits Committee has classified the exhibits into three basic areas that address the questions:

1. Where do computers come from?
2. How do computers work?
3. What do computers do?

What sort of exhibits might best tackle these questions? Should the Museum have separate galleries that address each area in turn, or should these subjects appear as layers within all the Museum's exhibits? The following pages sketch out some ways in which exhibits might present answers to these questions. A concluding section discusses the style that Museum exhibits should adopt to maximize their educational value. The intent is to stimulate discussion that will provide input towards the Museum's long range plan.

1. Where Do Computers Come From?

The principle underlying the layout of the Museum's present exhibits excluding "Smart Machines" and "The Computer and the Image" is fundamentally chronological, starting with Whirlwind and ending with personal computers. The thread is loosely woven, and appears not to be a useful organization for visitors.

The Museum could mount a concentrated historical exhibit with many artifacts, tracing the early development of computers. However, it is felt that this approach would be hard to make exciting

to more than the most computer-educated of the Museum's audience. Instead, the Museum is preparing a bay which will contain all the collections' jewels that are not on public display. This will be viewable on request.

Several alternatives towards presenting computer history have been suggested. A film could be produced, chronicling the development of computing using a high quality professional presenter and using excerpts from the Museum's unique collection of vintage computer films. The film could be shown in a special introductory theater near the Museum entrance to be shown to all visitors. The era of giant vacuum tube computing is well represented by the SAGE. An enhanced SAGE exhibit can present this period in an exciting way that could have an impact on almost all of the Museum's visitors. Other aspects of computer history could be treated as sections within several of the currently proposed new exhibits (see below) . The "Personal Computer Exploration Center" would present the history of personal computing, incorporating items from the Museum's rich collection of early machines and ephemera. "The Networked Society" exhibit would include a history of the deployment of large-scale computers in on-line transaction processing. "The Interactive Image" would contain hardware and images from early computer graphics. "Software" would incorporate a section on the evolution of programming paradigms.

2. How Do Computers Work?

The following are two sketches as to how the second question might be tackled in independent exhibits.

Approach 1: "Soup Machine"

The name "Soup Machine" comes from the National Museum of Science and Technology in Ottawa. In their computer gallery, they feature a wall-sized display that runs through a ten minute program in which an animated machine with moving parts, voice and lights makes soup. The recipe is an analogy for the program, the ingredients for the input data, and the soup for the resulting output. The program consists of instructions that require steps to be repeated, thereby enabling the modelling of program loops. The display is somewhat corny, but makes an unforgettable impression.

The Computer Museum could approach "How Computers Work" in a similar spirit by creating a large scale animated display. The display would convey several fundamental notions while being entertaining.

Approach 2: Anatomy of a Computer

This could be adopted together with the first approach. Here, the eye-catching display would be a large 'anatomical' model of a computer. For example, a personal computer might be modelled as a box 10 feet on a side, with cards 8 feet high. A giant keyboard and monitor would enable visitors to stand on keys, and send characters to a large display. Components of special importance would be expanded to explain what they do and how they tie into the computer as a whole. For example, the processor would be shown in the form of an interactive simulation showing several registers, and enabling visitors to run through several fetch/execute cycles. A RAM would be shown together with a simulation showing the writing and reading of some data. Other types of memory, such as floppy disk, hard disk, tape and CD-ROM would be shown. Other components that might be featured include the bus, interfaces, mouse, and modem. In each case, the inner workings of the component might be shown as a kind of inset into the large model.

It is important to convey the notion of a central, controlling processor that is driven to execute a step of a program at each tick of a clock. The various types of memory and communications supply information to and from the processor and to the peripherals. It would also be very important to present software that controls the computer's behaviour. Perhaps the giant model would be executing a program whose instructions were displayed in a high level language and then in binary after compilation (or interpretation).

As an alternative to an independent exhibit on the subject, aspects of how computers work could naturally be presented as sections of other exhibits, some of which are described below. For example, the "Personal Computer Exploration Center" could contain within it a section very much like "Anatomy of a Computer" described above. "The Networked Society" would reveal the workings of the technology used in the various industries featured. "The Ubiquitous Computer" could include an explanation of how semiconductor devices work. "Software" would in large part be an explanatory

exhibit presenting aspects of how programs are built and how they work.

3. What Do Computers Do?

Computer applications lend themselves to treatment in exhibits. The Museum's current exhibits "The Computer and the Image" and "Smart Machines" are good examples of exhibits that focus on particular application areas. The following are outlines of new exhibits that would emphasize applications.

The Personal Computer Exploration Center

This exhibit would be devoted to the history, technology and applications of the personal computer. The three sections of the exhibit would directly address the three fundamental areas identified by the exhibits committee.

The historical section would present the dramatic trend of decreasing cost and increasing performance using 10-20 historically significant machines as milestones. Projections into the future would reveal how the fast pace of change is expected to continue, emphasizing the spread of personal computers across different sections of the population and across the world. Vintage magazines, advertisements and other ephemera would evoke the spirit of the early "hacker" days. Biographies of the key entrepreneurs and inventors would also add to the human interest of the story.

The centerpiece of a section on how personal computers work would be a giant landscape model of the parts of the computers, as described for an independent exhibit "Anatomy of a Computer" above. The display would be exciting to watch, and would be large enough to act as a focus for tour groups of 30 people. The exhibit would aim to demystify the parts of a computer that the public may have heard of, but not know anything about.

In the largest section of the exhibit approximately eight key application areas of personal computers would be presented. The applications would be grouped according to the type of person or occupation that might use them. This should encourage visitors to identify themselves with the most appropriate demonstrations. For example, educational software, bulletin boards and games might be

presented in a section of software a high school student might be using. A businessman might be shown using electronic mail, accounting software and spreadsheets. A musician would be using composition and performance software with the personal computer interfaced to an instrument. The public would be able to interact with simplified versions of the software that yield rapid payoff and insight into the functions being performed. Other functions would be presented non-interactively through video or previously composed screens of text, graphics, and animation.

The Networked Society

This exhibit would focus on large-scale business uses of networked computers upon which modern society depends. The featured applications would be drawn from the banking, financial, airline, telephone, manufacturing, utility and retailing industries. The exhibit would make extensive use of mock-ups, video, and hands-on interactive displays that take Museum visitors right to the heart of these vital but invisible computer applications. For example, visitors would make reservations on a real airline reservation system (suitably protected), or switch trunk telephone lines in response to a simulated failure. The demonstrations would reveal the role of the computers play in these industries.

The question of how the systems that provide these services actually work could be addressed by means of a layer of explanation within the exhibit. In addition, a historical perspective on each application could be presented. Then and now contrasts would help drive home the nature of the tasks performed by computers today.

The Ubiquitous Computer

This exhibit would reveal and explain the presence and function of computers inside a wide range of devices. Visitors would perceive a common thread running through all the apparently diverse applications: sensing, processing and controlling. In contrast to "The Networked Society" which presents the large-scale, centralized aspect of computing, this exhibit shows how widespread and everyday functions can be enhanced using embedded, self-contained computers.

The exhibit's centerpiece would be a portion of a full-size automobile, cut-away (or transparent) so as to reveal the IC's it contains. Examples would include sensors and controllers for ignition timing, fuel injection, exhaust oxygen, braking, suspension, steering, and climate. Interactive graphical simulations would be developed for selected functions, enabling visitors to select various input values and see how the controller would respond to maintain optimal running conditions in the car.

Other examples of embedded microprocessors would be shown in consumer products such as telephones, televisions, video players, wristwatches, cameras, sewing machines, microwave ovens, synthesizers, toys as well as in industrial and agricultural machines. In each case, the device would be shown with a cut-away to expose the embedded chip, and a combination of text, graphics, video or interactive simulation would reveal the role and functioning of the IC. Where appropriate, the devices that were replaced by the introduction of the chip would also be displayed. In the case of the car, examples include the carburetor and the distributor.

As with other application oriented exhibits, the underlying technology could be explained. For example, an introductory section on the integrated circuit could present the basics of microelectronic technology and concentrate on how a typical controller chip works. Exhibits would include a chip under a microscope, large plots of the circuits on a chip pointing out the functions of the various parts, and several computer-based simulations allowing visitors to set various inputs from sensors and see the corresponding commands sent out by a controller.

Exhibit Style

The Museum's mission states that exhibits and programs should educate and inspire all ages and levels of the public. This is an ambitious agenda, for most educational experiences are targeted to a particular sector of the public. However, unlike most other educational institutions, the Museum has at its disposal a powerful medium - the exhibit. Exhibits comprise many media - artifacts, graphics, video, hands-on interactive displays, and entire environments. Each medium can be targeted to a particular level. In addition, the interactive exhibits can follow a path that is, to some extent, directed by each visitor. The goal of an exhibit should be to

reach out to as wide an audience as possible by featuring many different experiences at each level.

A widely adopted philosophy is to attract attention with an eye-catching, appealing display, and associate with it deeper material for those who seek it. The idea is to present information when visitors' curiosity is piqued. In this spirit, it can be argued that the history and technology of computing are best presented as deeper layers of exhibits that present computers performing exciting applications. For example, a visitor may be receptive to an explanation of how a silicon chip works when they have just used chips to control the performance of a simulated car.

The Museum's audience can be classified into three broad constituencies. The first are the computer professionals. The second constituency comprises those whose lives are affected by computers, either because they use them in their work, or because family or friends are involved with computers. The last group are youth, who visit the museum with their schools or families.

The Museum may best serve the widest audience by acknowledging that any particular exhibit may appeal primarily to, say, two out of the three constituencies. Considered as a whole, however, the Museum's mix of exhibits can still serve all groups well.

Many of the Museum's current interactive exhibits have attracted the attention of exhibit developers in other cities, such as the Franklin Institute in Philadelphia and the Science Center of St. Louis. They have approached the Museum to see if copies can be used in their new exhibits. To respond to this demand, the Museum has considered publishing "Cookbooks" of exhibit recipes that could be sold to other museums and science centers. The Museum could extend its educational role well beyond its local area by establishing leadership in the development of educational interactive exhibits on computing and distributing copies across the nation.

END

Oliver Strimpel
6/7/88

how should we apply our space?
Should we exhibit how computers work

process going thru
Richard Fowler this summer

constituencies idea:
do they agree

funding issues:
PC gifts 150K
what do we do next
any sources of funding

do exit surveys

Thinking Machines -
Supermarket Checkout

Broad outreach to multiple audiences - everybody

Bake & switch - Jonathan Rotenberg

Van Gogh exhibit - Lynda Bodman

lots of support for online reservation, etc. if it shows how
it works & maybe what the history is

The Computer Museum

300 Congress Street
Boston, MA 02210
(617) 426-2800

May 13 1988

Gardner Hendrie
342 Green Street
Northboro
MA 01532

Dear Gardner,

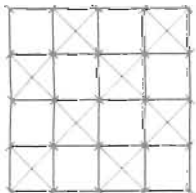
I enclose a draft of the minutes of the last exhibit committee meeting. They appear a little disconnected, but I hope they record the substance of the meeting.

I look forward to talking with you next week. If we are going to fly down to New Jersey on Monday 23rd May to see Bob Lucky, maybe we should cancel our breakfast meeting of May 20 as we will have time to talk on the plane and while driving to Bell Labs.

Yours,



Oliver Strimpel





International Business Machines Corporation

6600 Rockledge Drive
Bethesda, Maryland 20817

May 9, 1988

Mrs. Gwen Bell
The Computer Museum
300 Congress Street
Boston, MA 02210

Dear Gwen:

This is a letter to express some thoughts based on your March 22, 1988 letter about the Collections Committee, and in particular the "rules for the Computer Museum library".

It seems to me that the library should not be a very important issue for the Museum. I don't mean there shouldn't be one; I do mean that it should be a low priority for archival purposes, since the Charles Babbage Institute is in a much better position to do this.

I agree that "All books written before 1900 (and some books after 1900) should be considered 'rare' and treated as artifacts". However I do not agree that they should be in the Computer Museum. I think CBI is a more appropriate place.

I disagree strongly with the acquisition rules that say "accept all" of the following kinds:

-- Computer science and technology books written before 1965 (unless they are directly related to items in the museum collection).

-- Biographies and autobiographies of computer scientists and technologists and ...

-- An entire collection from a significant computer scientist who justifies that all the books relate directly to computer science.

Special Note: I have an excellent collection of several hundred books, primarily software and/or programming languages. In spite of my strong support for the Computer Museum, I would not dream of giving these books to the museum. I think the computing community, and that part of it interested in history, is much better served by having the paper material clustered at CBI.

As a separate comment, I note with sadness every time I look at the books in the Computer Museum store that it does not contain the two major books dealing with computing history, namely the proceedings of the Los Alamos and HOPL conferences. It seems to me that they should always be on display, and that a small stock should be kept in the store for sale, rather than the large number of miscellaneous books which have nothing to do with history.

If you wish to circulate this letter to other members of the collections committee, that is fine with me.

Sincerely yours,



Jean E. Sammet

cc: Joe Cashen
Gardner Hendrie
Oliver Strimpl

Minutes of the Exhibits Committee Meeting of May 9 1988

Present: Gardner Hendrie (Chairman), Gwen Bell, Joe Cashen, Bernard Cohen, James McKenny, Robert Metcalfe, David Nelson, Oliver Strimpel

How should we allocate our exhibit space?

GH introduced the notion of looking at exhibits as thematic or generic. Thematic exhibits, such as Smart Machines, The Interactive Image, SAGE, PC Exploration Center, The Networked Society and The Ubiquitous Computer present an application area or a particular type of computer usage. Generic exhibits address questions such as "How does a computer work?" and "How were computers developed?"

BC presented an overview of the Smithsonian's new exhibit. Their theme will be the nature of information; the first 1/3rd of the space will consist of a sequence of scenarios, starting with the laying of the Transatlantic Cable. Visitors will next see a reconstruction of ENIAC, followed by displays showing the emergence of the computer industry including many working examples. Some discussion of how computers work will also be included.

BC felt that three points should be conveyed with regard to how computers work: 1. Why miniaturize? 2. The difference between software and hardware 3. What is software like, what are the elements of a program? The aim is to raise awareness, not give a computer course.

RM asked whether the Museum's mission statement could guide the allocation of exhibit space. GH said that as the mission states that exhibits should educate and inspire ALL levels of the public, one could look at the space in terms of how they serve the Museum's three constituencies (computer knowledgeable, those directly affected by computers, and the young).

RM asked what we might display that could be as uniquely appealing as the world's largest tree that he recently drove 12 hours to see. OS thought an improved SAGE exhibit might come closest. DN suggested that SAGE's size be reinforced through models or other means.

GH asked whether the Museum should have an exhibit on history, including hardware and software. GB said social history should be included. JM thought this should include how the computers were used, produced, what they replaced and what effect it had on an organization.

RM suggested a list of what would not be possible without computers.

The group felt software was important, all the more as it represents an increasing portion of the computer business in economic terms. DN picked a key software development for each decade: 40's stored program, 50's autocode, 60's languages, 70's structured programming, 80's object-oriented programming.

GB asked whether "well-rounded" was the goal the exhibits should be striving toward. DN suggested a gradation, from very interactive at one end to more historical at the other. JC preferred to think of the whole set of exhibits as a system, most of which should have broad appeal. OS said visitors 'maraud', follow their own path, so that order of exhibits is less important than correct content overall.

GH asked whether space should be devoted to how computers work. RM said that this, together with what they do and where they came from are three important aspects that we should present in a lively, interactive fashion, encouraging visitors to experience success while using computers in hands-on exhibits. DN felt history was the main point of the Museum; other subjects could be learned about elsewhere. JM felt that how computers work and their history should be presented, but in the context of how they're used. The ATM was a good example. Economics should also be addressed. BC also supported both types of generic exhibit, and cited the example of the credit card.

It was felt that specific descriptions of exhibit alternatives might help the committee members decide whether the generic subjects should be addressed in separate, dedicated exhibits, or embedded in thematic exhibits.

The next meeting was planned for the afternoon of June 17 1988 immediately after the meeting of The Computer Museum Board. Max Hopper would be invited to attend.

OS 5/11/88

Keeler

MAJOR EXHIBIT IDEAS



Education
Draw
Financiality

cost

- Personal Computer Exploration Center		.7	3500	50 -100 100
- The Interactive Image		.5	250	
- The Computer Age				
The Chip and How it Works		.5	100-200	50
The Networked Society	ATMs, POS, phone, airlines	.7-	150/module	
Ubiquitous Computing	cars, watches, oven	?	250	
Entrance - Companies				
welcome - Chavelle		.5	35	
theater - Univys		.9	50	
Sage - old then & now		.5	100	
Future Computing		?	250	

Linda Bodman - invite to be on exhibits committee
 see Dave Nelson @ Appollo & review Exhibits
 see Bob Lucky @ AT&T

Oliver
 Dave out 4/4 - 4/7
 Gwen out 4/18 - 4/22

EXHIBITS COMMITTEE

1. Introduction:

Overview of existing exhibits

Summary of exhibit thinking to date including:

- mission
- taxonomy of the field
- exhibit proposals
- travel

2. Discussion:

ideas for new exhibits and upgrades coupled to funding opportunities

Special focus on entry bay, PCEC, Future Computing, Interactive Image, Census, Computerized Society

mission

~~Context Thinking~~

taxonomy
prescription of major exhibits over next 4 years
tour

~~alternates~~
travelling vs museum exhibits

~~alternate exhibit proposals~~

time line

time, date place & subject for next meeting

P.S. Please bring your calendars

"19. Check all computer exhibits and programs (lectures/workshops) listed below that would most appeal to your group."

Rank	Checks	Exhibit
1	754	Computer Games
2	748	Computer Graphics
3	745	How Computers Work
4	684	New and Future Technology
5	668	Computers in Education
6	646	Invisible Computing in Daily Life
7	644	Personal Computers
8	576	Computers that Run Society
9	572	Computer Software
10	520	History of Computing
11	512	Computer Hardware
12	499	Computers in Science
13	497	Computer Careers
14	497	Computers in Communication
15	494	Computers in The Arts
16	432	Computers in Medicine
17	417	Social Impact of Computing
18	404	Computers in Industry
19	390	Computers in Business
20	213	Computing in Japan
21	186	Demographic Data on Computing
22	38	Other

9747 (average person checked 9.1 exhibits - total pop = 1062)

PERSONAL COMPUTER EXPLORATION CENTER

PROPOSAL FOR A MAJOR NEW EXHIBIT AT THE COMPUTER MUSEUM

The Computer Museum proposes to develop a major, hands-on exhibit devoted to the history, technology and applications of the personal computer.

The displays will be dynamic, attracting attention of visitors with a wide range of computer experience.

Motivation

Public interest in the personal computer (PC) is high. It is a mass-produced item, advertised and sold like any other electrical appliance. Yet its range of applications and potential to affect professional and recreational life is almost limitless. In addition, its widespread introduction into schools and colleges is beginning to radically alter teaching, learning and research. The public is intrigued by PC's, and would like to know more about them. This is particularly true of people who are considering purchasing one, or who already own one.

The Personal Computer Exploration Center (PCEC) at The Computer Museum would serve an important educational function. It would provide the public with an objective, highly accessible source of information on PC's. PC's would be presented in a way that focussed on the unit as a consumer item, enabling the public to project themselves and their needs into the exhibit.

Size, Timescale and Cost

The PCEC would occupy $1 - 1\frac{1}{2}$ small bays of the Museum occupying 2,500 - 3,750 square feet. Exhibit development would start as soon as funding was obtained. The exhibit would open one year after funding was received.

The exhibit would cost from \$800,000 to \$1,200,000 depending on its overall size. Thirty percent of the resources would be derived from in-kind donations of hardware, software and the effort of individuals. Seventy percent (\$550,000 - \$800,000) would be needed in cash for the research and curatorial development, design, fabrication, display equipment and audio-visual presentations.

Content

1. Where Do PC's Come From?

The Museum has the world's finest collection of early PC's, including the first PC (Kenbak-1, 1971), the first computer to use a microprocessor (Micral, 1973) and an Apple 1 (1975). This section will display the dramatic trend of decreasing cost and increasing performance, using 10-20 historically significant machines as milestones. Projections into the future will reveal how the fast pace of change is expected to continue, emphasizing the spread of PC's across different sections of the population and across the world. Vintage magazines, advertisements and other ephemera will evoke the spirit of the early "hacker" days. Biographies of the key entrepreneurs and inventors will also add to the human interest of the story.

2. How PC's Work

A large dynamic model will show the landscape inside a PC, with magnifying glasses focussing on key components. These will include the microprocessor, memory, display, floppy and hard disk drives, ports and printer. The display will be exciting to watch, and will be large enough to act as a focus for tour groups of 30 people. The exhibit will aim to demystify the parts of a computer that the public may have heard of, but not know anything about. In addition, light and sound effects will amaze and delight all visitors, arousing the curiosity of even the least technically minded and thereby imparting a new level of fundamental computer literacy.

3. PC Users

The largest section of the exhibit will present 5-8 stereotypical users of PC's, complete with mock-ups of their work or home environments. For each user, a PC that best suits their needs will be displayed. The PC will be running a selection of software typical of that user. The public will be able to interact with simplified versions of the software that yield rapid payoff and insight into the functions being performed. Other functions will be presented non-interactively through video or previously composed screens of text, graphics, and animation. The following list indicates some of the stereotypes and software that might be included.

STEREOTYPE	PC	SOFTWARE
high school student	Apple II	games, educational, bulletin bds
professional	IBM System/2	word processing, spreadsheet
musician	Apple Macintosh	composition, sequencing
graphic artist	Amiga	paint, draw
small business	PC Clone	accounting, billing, tax
executive	Toshiba laptop	word processing, calendar
engineer/designer	NEC APC IV	CAD

The specifications and approximate cost of each displayed PC will be indicated. Each scenario will have several stations to increase the visitor throughput. There will be a total of 20-30 hands on exhibits.

The rapid progress in the field of personal computing makes it essential that the exhibit be thoroughly updated on a regular basis. Computers and software should be considered for upgrade on an 18 month cycle. This will ensure that the exhibit retains its dynamic state-of-the-art character.

4. To Learn More

A small section near the exhibit's exit will offer information about where to learn more about PC's and their uses. This will include literature on user groups, magazines, books, seminars, classes and other sources of information and training. In addition some reference publications and on-line resources will be available.

END

OS 1/13/88

EXHIBITS COMMITTEE MEETING, 3-5pm MARCH 30 1988 at
The Computer Museum

10K each - sell Ben
.5-2K each

AGENDA

1. The mission of The Computer Museum
2. Priorities for developing Museum Wharf site and offsite activities
3. Taxonomy of the field of computing from the exhibit point of view
4. Proposals for new exhibits
5. Short tour of the Museum's exhibit spaces
6. Planning exhibit-related activity through 1992
7. Time and place of the next meeting

Proposal status

	A	B	C	D	E	F
1	PROJECT	POTENTIAL FUNDER	AMOUNT	PROPOSER	STATUS	NEXT STEP
2						
3	Entry	Charette	\$35K	Dave Donaldson	interest expressed	get designer from Earl Powell
4						
5	Entry Film	Unisys	\$50K	GB, OS	proposal with Unisys	UNISYS to visit March 18
6						
7	SAGE	Boeing Aerospace	\$100K	Bob Everett	awaiting Bob	call Bob March
8		IBM	\$10K ?	OS, Jean Sammet	awaiting AWACS info	
9		Everett personally	\$10-25K	GB	Gwen's assignment	Gwen to call
10						
11	Census	Unisys	\$250K	GB	proposal with Unisys	Unisys to visit March 18
12						
13	Future Comp.	IBM	\$200K	Joe, Oliver	proposal to Naomi Seligman	
14		Nat Semiconductor	\$50K	GB	idea	switch from Chip
15		Sun	?	GB	idea	switch from Chip
16		Cullinet	\$50K	GB, OS	money granted for software	switch from software
17						
18						
19	Interactive	SIGGRAPH	\$20K	Tom DeFanti	granted	proposal, letter of intent
20	Image	Prime	\$300K?	GB	idea	write proposal
21		Kodak	?	OS	idea	discuss w Bob Gordon
22		Sony Foundation	?	OS	idea	call up, discuss
23		Apollo Computer	\$250K	GB, JC, OS	idea	discuss in detail with Dave N
24						
25	Games	Game manuf.	\$75K	Gwen, DH	idea	write proposal
26						
27	Chip	Nat Semi, Sun, etc	\$400K	Gwen	proposal with some prospects	abort in favor of Future C.
28						
29	Comp. Neur.	Rockwell	\$50K?	Caltech	idea	Tanya Mink to pursue
30		AT&T	\$50K	OS, GB?	idea	
31		Hecht Nielsen	\$50	OS	called up	chase
32		Battery Ventures	\$50K	OS	called up	chase
33		MASSCOMP	\$50K	OS	discussed with Sterling Hager	propose to MASSCOMP
34						
35	Computerized	American, others	\$800K	McKenny, OS	idea	visit Dallas, consult McKenny
36	Society	Ford Motor	\$100,000	GB	Chips in the auto; interested	

PCEC Prospects

	A	B	C	D	E
1	POTENTIAL FUNDER	AMOUNT	PROPOSER	STATUS	NEXT STEP
2					
3	David Bunnell	\$250K	OS & GB	waiting for dinner to clear	send letter with proposal
4	PC's Ltd	\$100K	MO, GB, Levy	waiting for MO, GB to push Levy	push Levy
5	Cabot Foundation	?	JC, MO	awaiting a meeting	set up meeting
6	Apple Computer	\$100K +	Metcalfe	idea	MO to call Metcalfe; proposal
7	Maxell	? feel out	CS	idea	
8	Compaq	?	GB, J. Doerr	idea	
9	Hearst Foundation	\$100K	GB	idea	send proposal
10	Computerland	\$50K	GB	idea - propose to Steve Watson	
11	Intel	\$50-100K	GB	idea	
12	Microsoft	\$350K	GB + GB	idea	
13	Ashton Tate	\$50K	GB	idea	
14	Ed Fredkin	\$100K	GB	idea	
15	Ted Johnson	\$50-100K	GB	idea	
16	Watson/ComputerLand	\$50-100K	GB	idea	

SUMMARY OF MEETING WITH BOB LUCKY ON MARCH 28 1988

As Bob Lucky was unable to attend the March 30 Exhibits Committee meeting, Gwen Bell and I met with him separately.

We discussed the Museum's major exhibit proposals:

Personal Computer Exploration Center: Bob thought exhibits on PC's would always be valuable at the Museum because PC's are so popular and close to people's hearts. However, he was less sure how glamorous it could be as PC's have already had a lot of exposure.

How Computers Work: This is a topic that has been proposed at various times either as a separate exhibit, or packaged as part of the PC exhibit. Bob was quite negative about the value of such an exhibit. By way of analogy, he cited the vacuum tube as an example of something very important, but whose inner workings were not interesting. "A hundred people chained to the basement of RCA have to know about vacuum tubes". He felt that everyone can use and exploit computers now without knowing how they work.

Networked society: Bob was most enthusiastic about this and was excited about the possibility of AT&T helping with a section on the phone network. Apparently AT&T have a situation room in which they track their systems' load and availability. They have sophisticated ways of automatically reconfiguring their lines to optimize the system's usage. He also suggested doing something on 'behind the scenes' at Disneyworld.

Ubiquitous Computing: Bob thought this was becoming a little old hat, at least with respect to many consumer items. However, he thought this would work very well with certain areas which are just becoming heavily computerized, such as the automobile.

Graphics: Bob felt graphics was so popular and such a natural for exhibits that there should always be an exhibit on that. He liked the idea of updating in time for the Boston SIGGRAPH 1989.

Defence Computing: Bob thought this would be both fascinating and of great public interest. There is plenty of exciting material that is not classified.

OS 3/30/88

The Computer Museum's Mission

To educate and inspire all ages and levels of the public through dynamic exhibitions and programs on the technology, applications and impact of computers.

To preserve and celebrate the history and understanding of computing worldwide.

To be an international resource for research into the history of computing.

MEMORANDUM

From : Gardner Hendrie
To : The Computer Museum Exhibits Committee: Gwen Bell,
Joseph F. Cashen, I. Bernard Cohen, Robert Lucky, James L.
McKenney, David Nelson, Oliver Strimpel, Sherry Turkle
Date : March 15 1988

EXHIBITS COMMITTEE MEETING, 3-5pm MARCH 30 1988 at The Computer Museum

AGENDA

- The mission of The Computer Museum
- Priorities for developing Museum Wharf site and offsite activities
- Taxonomy of the field of computing from the exhibit point of view
- Proposals for new exhibits
- Short tour of the Museum's exhibit spaces
- Planning exhibit-related activity through 1992

I enclose outline proposals for new exhibits on personal computers, future computing, computer graphics, the centenary of 1890 census and for an introductory film on the history of computing.

I look forward to an interesting and productive meeting. See you there!

P.S. Please bring your calendars with you to the meeting.

FUTURE COMPUTING: DRAFT PROPOSAL FOR A TRAVELLING EXHIBITION TO BE DEVELOPED BY THE COMPUTER MUSEUM

Motivation

Visitor surveys conducted at science and technology museums indicate that a common reason to visit such an institution is to bring one's knowledge of a subject up to date, and gain some insight as to its future direction. The Computer Museum has verified this in its own visitor surveys. Clearly, the need to remain up to date, and anticipate the future is greatest in a rapidly evolving field such as computing. It is therefore highly desirable that, in fulfillment of its educational mission, The Computer Museum mount an exhibition on the frontiers of computer technology today, and the more speculative technologies expected to become established during the 1990's.

Exhibit Content

The exhibition will feature three major aspects of computing: hardware, human interface and market factors. The topics will be presented in the form of visually exciting displays of artifacts and pictures, together with hands-on demonstrations of concepts. Wherever possible, real prototypes of the new technologies will be exhibited. The new technologies will be compared with their predecessors so that visitors can see what progress each aspect of the future technology implies.

Processing Hardware

The performance and price to performance ratio of computers will continue to improve at a rapid pace. The underlying technologies that make this possible will be demonstrated. Components that allow faster switching speeds, including gallium arsenide based semiconductors, superconducting devices and optical devices will be featured. In addition, the extent to which continuing miniaturization of existing semiconductor technology can continue will be explored. The trend set by semiconductors to date will be charted, and an interactive simulation will reveal how miniaturization equates to speed-up.

However, the major source of processing speedup over the next decades will be the progressive introduction of parallel architectures. Architectures for parallel computers will be explained with graphics

and simulated on a workstation. For example, visitors might see a simulation of a particular problem, such as the modelling of airflow over an aircraft wing, being solved on a serial machine, on a coarse-grain parallel machine and on a fine-grain parallel machine. Pipelining, multi-processors, vector machines and chaining will be included as variants on the theme of parallelism. Components of the key research parallel machines will be displayed, including parts of the ILLIAC IV, C.mmp, Cm* and other pioneering machines.

Computers and Communications

New ways of spreading computational workload and data will emerge with the installation of wider bandwidth networks, such as those using fiber optics. An interactive demonstration based on a plumbing analogy will drive home the huge communication capacities of the future, and discuss what the implications are for the sharing of video and quantities of text data measured in Library of Congress units.

Storage

Future advances in semiconductor, magnetic and optical storage will be presented in the context of the trends to date. Interactive simulations will drive home the enormous capacities and access rates involved.

Human Interface

Qualitatively improved human interfaces will be made possible through the application of speech recognition, natural language understanding and the adoption of new devices such as the dataglove, force-feedback manipulators, eye-tracking devices and scanners. The exhibit will demonstrate examples of new interfaces, offering visitors a first-hand experience of controlling a computer in a novel way. Each interactive exhibit would be accompanied by material that explains how the technology works, and explores some of its social ramifications, including applications for the handicapped.

Software

Computer software will change to take advantage of new parallel architectures. Interactive demonstrations will show how computers can solve problems by doing many things at once, rather than by executing one instruction at a time. Another trend that might be presented in the exhibit is computer-aided software engineering (CASE). A demonstration might ask visitors to pose a problem and

then see the computer generate a program to solve the problem. The exhibit will also present the idea of hypermedia, basing an interactive demonstration on a commercially available hypertext program.

Computer Demographics

Over the past 10 years since the beginning of the widespread introduction of personal computers, the number of machines as well as the nature of their application has changed dramatically. The exhibit will attempt to project the nature of computing up to the turn of the century, tracking such parameters as the number of computers, their size, their geographical and social distribution and their cost. The speculations of several notable forecasters may be quoted, with predicted trends presented in the form of a computer animation with a large, dramatic display.

Size, Schedule and Cost

The exhibit would occupy between 1,500 and 2,000 square feet. It would open at the Computer Museum approximately 10 months from the time that funds were committed to the project. After spending six months at The Computer Museum, the exhibit would travel under the auspices of the Smithsonian Institution Travelling Exhibition Service (SITES) or of the Association of Science and Technology Centers (ASTC). Approximately 8 institutions would host the exhibit over a period of two years.

The overall cash cost of exhibit development would be \$265,000 broken down as follows:

ITEM	CASH COST	IN KIND SUPPORT
exhibit development	\$90,000	\$30,000
text & graphics signs	\$25,000	
video production	\$15,000	\$20,000
exhibit design	\$40,000	
exhibit construction	\$50,000	
exhibit hardware	\$30,000	\$200,000
opening event	\$15,000	
TOTAL	\$265,000	\$250,000

The Museum has been very successful in securing 'in kind' contributions of equipment and effort from corporations and individuals. The equipment includes all the working exhibit computers and other hardware required in the demonstrations. The volunteer effort consists primarily of computer programming of the hands-on stations, but also includes consulting from experts in each field. As indicated in the above table, it is expected that approximately \$250,000 worth of goods and in-kind services would be donated towards this exhibit, bringing the total value to \$515,000.

END OS 2/12/88

**Proposal for
A TRAVELLING EXHIBIT**

YOU COUNT!

The Technology and Impact of Censuses

**Celebrating the 100th Anniversary of
Automating the 1890 US Census**

**The Computer Museum and
SITES, The Smithsonian Institution Travelling Exhibit
Service**

Sponsored by UNISYS

Outline of the proposal

- Background
- Organization
- Promotion and Audience
- Exhibit Plan
- Educational Components
- Schedule
- Budget

Background

In the 1880s, it became clear that the 1890 US census would never be complete without new technology. Faced with Constitutional proportional representation, the US Congress was forced to consider radical new technologies to achieve this political purpose. A competition was held that resulted in an electrified card-counting machine installed to tabulate the 1890 census. Quickly other nations, including Russia and Austria, purchased census tabulating machines for their own use. From this time forward, the US Census Bureau has been at the forefront of using new technology for data processing. They bought the first UNIVAC I, the first general purpose commercial electronic computer, for the 1950 census. Currently, they use advanced machines and techniques that provide accurate censuses.

A travelling exhibit will explain the changing technologies and social issues that drive censuses. The exhibit will be historical and interactive, based on artifacts, films, photos, and the use of computers to pose questions, solve problems, and create simulated scenarios. Both social and technical questions will be explored in six vignettes: the early censuses; 1890; 1930; 1950; 1990; and the future. The displays will relate the census to important political, economic, social, and natural resource issues. The exhibit will be engaging and dynamic, attracting an audience of families, educators, and students.

Organization

The exhibit will be developed by The Computer Museum and will open no later than October 1989 to celebrate the 1990 census. It will then travel to at least ten cities over a minimum of two years.

The exhibit will be presented to SITES, The Smithsonian Institution Travelling Exhibit Service, to travel under their aegis. SITES is the outreach arm of The Smithsonian, providing quality educational exhibitions throughout the United States. Preliminary discussions have determined their interest in this exhibit. If accepted, SITES markets and manages the exhibit during its period on the road. SITES will work with the developer (The Computer Museum) and the sponsor (UNISYS) to book the exhibit at specific institutions and in specific cities.

The project director will be Dr. Gwen Bell, Founding President; the interactive computing components will be under the direction of Dr. Oliver Strimpel, Curator. In addition, an historian and a coordinator will be hired. An outside design firm and fabrication firm will be selected. A small review panel will include Professor I. Bernard Cohen, Harvard University, Betsy Hennings, The Smithsonian Institution Travelling Exhibit Service, and a nominee of the sponsor.

Promotion and Audience

This project can and should be promoted as broadly as possible in the context of celebrating the 100th anniversary of mechanized data processing. Nationwide news articles and television spots should be targetted. The Museum has achieved such coverage in several anniversary events, including the 40th anniversary of the ENIAC and the 25th anniversary of computer games.

To promote interest in the exhibit a national junior high school essay competition on the theme "You Count" could be created. This could also be repeated at the local level for each exhibit site. (No budget has been considered for this promotional feature.)

Over two years, one to two million people will see the exhibit and its audience via the media will be hundreds of times that number. Both science and history museums are prime candidates to book the exhibit.

Exhibit Components

1. **The First Censuses:** A survey of various early attempts to count people, e.g., the Romans, the English doomsday book, and the early US.
2. **1890:** The advent of the electrified tabulating machine and the great immigration to the US. A reproduction of the original Hollerith card punch and tabulating system can be used for demonstrations. In addition, a working model will allow the visitor to use the pantograph system to punch his own card. An interactive component will encourage the visitor to speculate about: "What would have been the character of the Congress if the census had not been completed? Would the Democrats or Republicans have had more control? Who would not have been elected? What was the impact of redistricting on the makeup of the Congress?"

3. The 1930's: The total electrification of the Census. A recreation of a card computing system of the era and a film of a card system in action will capture this period. Social questions relating to the stockmarket crash, the mechanization of agriculture, and the introduction of such systems as Social Security can be illustrated with simulations of various scenarios.

4. The 1950's: The introduction of electronic computing. A recreation of the UNIVAC I will be used to establish contrasts with the earlier card tabulating systems showing the order of magnitude change in speed and storage space. Selecting appropriate data bases from this era to illustrate postwar population growth will allow the exhibit to be handtailored to each site.

5. The 1990 Census: The configuration of the current census machines. The emphasis will change from the hardware to the software improvements. The increasing range of data collected by the census from 1890 to 1990 will be shown. The use of statistical techniques, such as sampling, and specialized software development will be illustrated. Cooperation with the Census Bureau will be important to explain their current operation.

6. The Future: How do new technologies relate to the Census? What are new data processing, storage, programming, and data input systems that might be implemented? Video will be used to present the visions of experts and forecasters. The visitor will be provided with a way to record his own views.

Synthesis: Once again, a global view would be shown. A clock showing the growth of the numbers of computers and the numbers of people around the world. The question, "Why do 'YOU COUNT'?" will be explicated asked. Innovative ways will be developed to challenge and intrigue the visitor.

Educational Materials.

This exhibit lends itself to the development of a brochure that explains a brief summary of the history of computing and the census. Such a pamphlet would be produced for free distribution in teacher pre-visit materials to aid in school group visits and for sale in museum shops.

A special school package with pre- and post-visit materials will be developed for the junior-high level. This will include bibliographies, lists of films, and other materials that the teacher might use, and excises for classroom use.

Finally, contacts will be made with a publisher for a book based on the research carried out for the exhibition.

Schedule

1/1/88 - 7/1/88

- Secure funding
- Make agreement with SITES
- Establish a development team
- Start historical research

7/1/88 - 1/1/89

- Select designer and fabricator
- Complete historical research
- Specify interactive elements
- Outline educational materials

1/1/89 - 7/1/89

- Complete design
- Begin testing interactive components
- Complete editing exhibit text, films, and photos.
- Assemble artifacts

7/1/89 - 9/30/89

- Complete fabrication
- Install exhibit

10/1/89

- Open at The Computer Museum
- Fabricate crates

2/1/90

- Open at Another Museum

	7/1/88	1/1/89	7/1/89	TOTAL
CASH NEEDS				
Exhibit Development				
Historic Scenario	20,000	5,000		25,000
Interactive Components	10,000	20,000	10,000	40,000
Exhibit Coordination	10,000	10,000	5,000	25,000
Exhibit Design		50,000	15,000	65,000
Exhibit Fabrication		40,000	60,000	100,000
Equipment			10,000	10,000
Promotion			25,000	25,000
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TOTAL CASH NEEDS	\$40,000	\$125,000	\$125,000	\$290,000
<hr/>				
IN-KIND CONTRIBUTIONS				
Twelve Personal Computers		60,000		60,000
Four Large Video Monitors		20,000		20,000
Programming Interactive Elements		50,000		50,000
Editing for Video		15,000		15,000
Public Relations		25,000		25,000
<hr/>				
TOTAL IN-KIND CONTRIBUTIONS				\$160,000
<hr/>				
GRAND TOTAL EXHIBITION COST				\$450,000

* No estimation has been made for the contribution of SITES to the travelling component. On acceptance, they often agree to market the exhibit, pay for crating, and cover the insurance.

THE INTERACTIVE IMAGE

Outline Proposal for a Major New Exhibit on Computer Graphics at The Computer Museum

The field of computer graphics has advanced very rapidly in recent years. The Computer Museum plans to develop a major new exhibit that presents the principles, history and cutting edge of computer graphics and its applications. Two factors make the creation of a new exhibit especially timely: the first is the availability of several dynamic interactive displays from a special exhibit prepared by the Electronic Visualization Laboratory at the University of Illinois at Chicago; the second is the 1989 ACM SIGGRAPH conference, to be held in Boston July 31 - August 4. Over 30,000 computer graphics professionals are expected to attend the conference and trade show. A 1989 opening of a new computer graphics exhibit at the Museum will attract many attendees, thereby giving the exhibit and its sponsors excellent exposure to the computer graphics community.

Exhibit Content

The Interactive Image is proposed as a state-of-the-art, involving exhibit, that appeals to all levels of the Museum-going public. It would address the following topics:

- the nature of computer images: spatial resolution, grey levels, color
- enhancing images to extract useful information
- creating synthetic images, rendering methods, fractals, graftals
- modelling for design and engineering
- visualization in scientific computing
- computer animation
- 3-dimensional graphics

The applications of the technology in science, engineering, design, entertainment, education and art will be portrayed in conjunction with the demonstrations of the technology. The exhibits would consist of hands-on displays, video, film and photographs to be developed by The Computer Museum. In addition, seven interactive displays would be provided by the Electronic Visualization Laboratory at the University of Illinois at Chicago. Finally, improved versions of the most successful demonstrations currently on display in Museum's Computer Image gallery would also be included.

TimeScale, Size and Cost

The exhibit would occupy 4,000 square feet in a single large bay at The Computer Museum. This space would house the new gallery's 20 hands-on stations, 4 video programs, film theater, holograms, laserspace and text and photographs. This bay is currently occupied by The Computer and the Image exhibit which would be closed down approximately 4 months before the opening of The Interactive Image gallery.

The exhibit would take approximately 8 months to develop from the time of funding.

The budget for the development of the exhibit is as follows:

ITEM	CASH COST (\$K)	IN KIND (\$K)
exhibit development	50	40
exhibit design	40	
exhibit construction	50	
photographs & text	20	10
video editing	10	20
film production	15	5
exhibit hardware	10	100
shipping, contingency	10	
opening event	15	
TOTAL	220	175

A grant of \$20,000 has already been awarded to the project by the ACM SIGGRAPH.

The "in kind" column refers to the value of goods and services that is expected to be donated to the project. The Museum has been very successful in securing donations of equipment on which to run the interactive displays, as well as programming and other development effort from volunteers.

OS
3/2/88

PERSONAL COMPUTER EXPLORATION CENTER

PROPOSAL FOR A MAJOR NEW EXHIBIT AT THE COMPUTER MUSEUM

The Computer Museum proposes to develop a major, hands-on exhibit devoted to the history, technology and applications of the personal computer.

The displays will be dynamic, attracting attention of visitors with a wide range of computer experience.

Motivation

Public interest in the personal computer (PC) is high. It is a mass-produced item, advertised and sold like any other electrical appliance. Yet its range of applications and potential to affect professional and recreational life is almost limitless. In addition, its widespread introduction into schools and colleges is beginning to radically alter teaching, learning and research. The public is intrigued by PC's, and would like to know more about them. This is particularly true of people who are considering purchasing one, or who already own one.

The Personal Computer Exploration Center (PCEC) at The Computer Museum would serve an important educational function. It would provide the public with an objective, highly accessible source of information on PC's. PC's would be presented in a way that focussed on the unit as a consumer item, enabling the public to project themselves and their needs into the exhibit.

Size, Timescale and Cost

The PCEC would occupy $1 - 1\frac{1}{2}$ small bays of the Museum occupying 2,500 - 3,750 square feet. Exhibit development would start as soon as funding was obtained. The exhibit would open one year after funding was received.

The exhibit would cost from \$800,000 to \$1,200,000 depending on its overall size. Thirty percent of the resources would be derived from in-kind donations of hardware, software and the effort of individuals. Seventy percent (\$550,000 - \$800,000) would be needed in cash for the research and curatorial development, design, fabrication, display equipment and audio-visual presentations.

Content

1. Where Do PC's Come From?

The Museum has the world's finest collection of early PC's, including the first PC (Kenbak-1, 1971), the first computer to use a microprocessor (Micral, 1973) and an Apple 1 (1975). This section will display the dramatic trend of decreasing cost and increasing performance, using 10-20 historically significant machines as milestones. Projections into the future will reveal how the fast pace of change is expected to continue, emphasizing the spread of PC's across different sections of the population and across the world. Vintage magazines, advertisements and other ephemera will evoke the spirit of the early "hacker" days. Biographies of the key entrepreneurs and inventors will also add to the human interest of the story.

2. How PC's Work

A large dynamic model will show the landscape inside a PC, with magnifying glasses focussing on key components. These will include the microprocessor, memory, display, floppy and hard disk drives, ports and printer. The display will be exciting to watch, and will be large enough to act as a focus for tour groups of 30 people. The exhibit will aim to demystify the parts of a computer that the public may have heard of, but not know anything about. In addition, light and sound effects will amaze and delight all visitors, arousing the curiosity of even the least technically minded and thereby imparting a new level of fundamental computer literacy.

3. PC Users

The largest section of the exhibit will present 5-8 stereotypical users of PC's, complete with mock-ups of their work or home environments. For each user, a PC that best suits their needs will be displayed. The PC will be running a selection of software typical of that user. The public will be able to interact with simplified versions of the software that yield rapid payoff and insight into the functions being performed. Other functions will be presented non-interactively through video or previously composed screens of text, graphics, and animation. The following list indicates some of the stereotypes and software that might be included.

STEREOTYPE	PC	SOFTWARE
high school student	Apple II	games, educational, bulletin bds
professional	IBM System/2	word processing, spreadsheet
musician	Apple Macintosh	composition, sequencing
graphic artist	Amiga	paint, draw
small business	PC Clone	accounting, billing, tax
executive	Toshiba laptop	word processing, calendar
engineer/designer	NEC APC IV	CAD

The specifications and approximate cost of each displayed PC will be indicated. Each scenario will have several stations to increase the visitor throughput. There will be a total of 20-30 hands on exhibits.

The rapid progress in the field of personal computing makes it essential that the exhibit be thoroughly updated on a regular basis. Computers and software should be considered for upgrade on an 18 month cycle. This will ensure that the exhibit retains its dynamic state-of-the-art character.

4. To Learn More

A small section near the exhibit's exit will offer information about where to learn more about PC's and their uses. This will include literature on user groups, magazines, books, seminars, classes and other sources of information and training. In addition some reference publications and on-line resources will be available.

END

OS 1/13/88

COMPUTERS, COMPUTERS EVERYWHERE

DRAFT PROPOSAL FOR AN EDUCATIONAL FILM ON COMPUTERS, PAST, PRESENT AND FUTURE

Concept

The Computer Museum has long recognized the need for a top quality introductory film to present computers to museum visitors, school students, and the interested general public.

The Museum proposes to create two films. The first would be 35-40 minutes long, and would be suitable for widespread distribution among schools, industry, and other institutions. The second film would be derived from the first film, but would be only 10-12 minutes long. This version would be suitable for continual screening at The Computer Museum's entrance.

The film must be very fast-paced and engaging. It must build on viewers' experiences, and rapidly carry them into exciting developments beyond their experience. In addition, the film must have concrete educational objectives so as to make it suitable for classroom use.

Theme

The film will present computing through its diverse applications. For each application, it will show what the computer is actually doing, revealing the fundamental unity of all computing activity as the gathering, manipulation, and presentation of information.

The story will be arranged chronologically by application, starting with the military and scientific, then business uses, presenting an ever widening circle of applications. The technology, software or hardware, that enabled each application will be highlighted.

The presentation of each application will be in three parts:

1. What exactly is the application?
2. What is the computer doing?
3. How does this affect people's lives?

Preliminary List of Application Areas

Ballistics

Air Defence

H Bomb

Election Forecast

Census

Business Payroll

Weather forecasting

Computer-aided design (cars, airplanes)

Word Processing

Modelling and simulation (the economy, a business, a physical system)

Visualization (science, engineering)

Credit cards

Home banking, shopping and ATM's

Spreadsheets & planning

Embedded controllers in home appliances and cars

Graphic design

Music

Simulation (flight simulation)

Robotics

Style

The film should probably be presented by a well-known popularizer, of the James Burke or David Attenborough variety. The presenter should be filmed on site, explaining the applications, and his/her voice should also be used to narrate other portions of the film.

The Museum's unique film collection of vintage computers should be used as a resource for the early applications.

Then and now comparisons will occasionally be appropriate, but many of the more recent applications do not really map directly onto earlier ways of doing things.

Some possible then/now comparisons include

- adding machine versus spreadsheet
- census data processing over the past 100 years
- word processing versus typewriters
- CAD versus drawing board

Additional Content

The film could throw light on careers in the computer field by presenting brief portraits of selected engineers, programmers, and so on who were responsible for some of the featured applications. This facet may be of particular importance for school audiences.

Budget

The Museum proposes that the film's sponsor take responsibility for the production of the film. This includes the employment of a director and producer for the film, as well as the physical costs associated with creating a film. The Computer Museum will provide resources to determine the main story and content of the film, supply historical footage and other materials from its collection. To ensure the film's objectivity, it is important that The Museum retain editorial control. A close consulting relationship with the director is envisaged.

The following budget covers the resources to be provided by The Computer Museum towards the creation of both the long film (duration 35-40 minutes) and the short film (duration 10-12 minutes).

Research & development	\$20,000
Provision of historical materials	\$10,000
Editorial consulting	\$20,000
TOTAL	\$50,000

The film is expected to take 6-8 months to produce, starting as soon as funds are committed. The Museum would start screening the short film as soon as it was received.

The Museum would collaborate with the sponsor to ensure widespread distribution of the film to schools, colleges, and industry.

END OS 2/11/88