Museums in the Information Age

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These are exciting times for museums. Through new technologies like digital imaging and local and global networks, they are able to capture and share information on their collections in ways that have only become possible in the last few years.

A look back at the history of the Museum Computer Network - almost thirty years - reveals the pioneering efforts in the area of museum automation. It has been a long courtship with technologies that only now are fulfilling the potential of the relationship.

The 1960's

Museums began using automation technologies in the early 1960's.

One of the first projects, was an outgrowth of the Automated Data Processing (ADP) Committee at the National Museum of Natural History which was formed in 1963. The system that resulted from this project was known as SELGEM which stood for 'Self-Generated Master'. SELGEM used text data fields that were delimited by numeric tags and special characters. The system and the source code were provided free-of-charge to museums but with the caveat that the system could not be supported by the Smithsonian if changes were made to the code.

In 1965, four organizations began to enter data into SELGEM databases — the Smithsonian, U. C. Berkeley (what museum), the Lowe Art Museum at the University of Florida, and the Oklahoma Inventory of Ethnological collections. At that time, all computer systems were mainframe systems. Disk storage and processing costs were expensive — the CPU's were usually owned by entities outside of the museum, for example, by a university or state agency.

Another project which has been very important to the computerization of museums began in 1967. Dr. Jack Heller, a professor of Computer Science at the State University of New York at Stony Brook (and devoted friend of the arts) started the Museum Computer Network. Dr. Heller collaborated with David Vance, who was working in the Registrars Office of the Museum of Modern Art in New York,

to organize a consortium of museums in New York City. The primary focus of the consortium was to automate the information on the collections in each museum.

Previously, Dr. Heller had developed a program that was in use at the United Nations. This early application was called GRIPHOS (Generalized Retrieval and Information Processing for Humanities Oriented Studies). Like SELGEM, this was a mainframe system with data field tags and delimited records. It was made available to museum through membership in the Museum Computer Network. The yearly membership fee was $1,000. Membership was to institutions only - not individuals, however, each institution was allowed two official delegates at the annual meetings.

Other MCN projects followed. In 1968, MCN and IBM sponsored a conference on computers and their potential application in museums. In 1969, David Vance began a standardization project with twelve art museums. This was one of the pioneering efforts in the standardization of museum information. This project produced a data dictionary that was used by all subsequent GRIPHOS users. Changes and additions were submitted to a committee for review. The definitions and the syntax of the information entered into each field was kept to a standard so, in theory, information could be shared among member institutions.

1960-1969

1963-ADP Committee formed at Smithsonian NMNH
1965-Museum data entered at Smithsonian, U.C. Berkeley, Lowe Art Museum, University of Florida, Oklahoma Inventory of Ethnological Collections
1967-MCN established by Jack Heller
1968-MCN/IBM Sponsor conference on Computers and their Potential Application in museums
1969-David Vance begins standardization project with 12 art museums

The 1970s

Both GRIPHOS and SELGEM were used during the entire decade of the 1970's. A number of institutions adopted the systems during this period. GRIPHOS was used by art museums as well as other types of museums including those with archaeological collections. The value of computerizing collections information was slowly being recognized by museums. In 1970, the Metropolitan Museum of Art held the second conference on computers and their potential application in museums.

In 1971, Robert Chenhall, who then worked for the Arkansas Archaeological Survey based at the University of Arkansas, held the first Archaeological Data Bank conference. In 1972, the Museum Computer Network was incorporated as a non-profit organization in New York. David Vance was the first President of the Board of Directors. Robert Chenhall was one of the first members. Chenhall worked with Vance to further develop the GRIPHOS data dictionary for use with archaeological collections.

The National Inventory Programme began in Canada in 1971. In 1972, the Museum Data Bank Coordinating Committee formed. This committee met several times during its lifetime to consider issues of computerizing museums collections. Each meeting resulted in a publication by the members of the committee who were the leading experts and practitioners in museum automation at the time. The committee disbanded in 1977.

In 1974, the Museum Computer Network moved to SUNY at Stony Brook. During this same year, I was introduced to GRIPHOS. The Florida Bureau of Historic Sites and Properties, following Chenhall's lead, began to use GRIPHOS to computerize a central databank of all recorded archaeological sites and properties in the State of Florida as well as the archaeological and architectural collections held by the Bureau. This project was managed by Frank Fryman. I was Frank's assistant and was responsible for much of the data entry as well as preparation of the data. At its beginning, the Florida Master Site File was estimated to have some 25,000 sites and properties and was expected to grow to as many as 250,000. GRIPHOS was running on an IBM 370 computer which was located at another state agency. The Bureau was a system user but had no hands-on interaction with the machine. We prepared punched cards and submitted them to the systems operators (we actually had to walk several blocks to drop the cards off and pick up the printouts). The program was read into the computer and the results would be available to us later that day or in some cases the next day. We were low-priority users. Our data was kept on a separate disk that had to be mounted on a drive whenever our programs were run. This disk was comprised of a stack of platters that resembled over-sized record albums.

In 1978, the Museum Computer Network decided to discontinue and phase out GRIPHOS. Many GRIPHOS users, including the Florida Bureau of Historic Sites and Properties, continued to use the system until viable alternatives could be found. Other GRIPHOS users included: the Arkansas Archaeological Survey, the Museum of Modern Art, the International Museum of Photography at the George Eastman House, as well as several museums in Australia.

Annual conferences of GRIPHOS users continued and gradually expanded to include others who were not using GRIPHOS, but who were already computerizing collections information or wanted to do so. GRIPHOS users were also sharing their ideas and needs with colleagues at other meetings including those of the American Association of Museums. Other events taking place in the computer industry and in other museums would soon begin to change the landscape of museum automation.

In 1977, the Apple computer emerged from a garage in the Silicon Valley. When this stone was tossed into the pool of the computer industry, museums were at the outer edges of the ripples. As with many significant advances in technology the effects would not be felt for some time, but computers were changed forever. In the same year the Museum Documentation Association (MDA) was formed in the United Kingdom. This group recognized the need for standards in the recording and automation of museum collections information. The MDA has become a leader in this area of standards for museums.

In the next year, another standard for the field, compiled by Robert Chenhall, was published by the American Association for State and Local History. NOMENCLATURE is an hierarchical thesaurus for naming objects based on their function. It was widely used and was later revised by James Blackaby.

The Museum Computer Network held its 1978 annual conference in New Haven, CT at Yale University. The year before, I met Lenore Sarasan and Bill Mayhew at another conference. Lenore was working with the Field Museum to develop data entry procedures for a large data entry project. Bill Mayhew was working as a programmer and overall systems developer for the Boston Children's Museum. Sarasan and Mayhew combined efforts to match her data entry techniques with his program, resulting was system that was used by the Children's Museum and a consortium of other museums in the Boston/Cambridge, Massachusetts area. Bill Mayhew later packaged and sold the system under the name RECOLLECT, and developed a membership system called REMEMBER. Bill no longer works in the museum field. Lenore Sarasan, on the other hand, has become one of the most well-known vendors of museum automation systems. She is currently the president of Willoughby Associates, Ltd. and is a former member of the MCN Board of Directors.

Following the 1978 MCN meeting, I had the opportunity to visit Bill Mayhew in Boston for a look at the system. At that time, it was running on a Digital Equipment Corp. PDP-11 computer. The fields accommodated a basic inventory of the collection. The system allowed the museums in the consortium to dial into the computer at the Children's Museum to enter and access their data.

One of the consortium members was the Peabody Museum of Archaeology and Ethnology at Harvard University. This began the Peabody's fourteen year history of collections information automation. Subsequent automation at the Peabody followed the general trends in the computer industry — from the time-sharing system to an in-house mini-computer system and now a client server networked environment.

In Detroit in 1979, the Detroit Institute of the Arts began a collections computerization project that resulted in a limited partnership with Burroughs Equipment Corp. and a system called DARIS (Detroit Art Registration Information System) It was used for cataloging, exhibition management, registration and object location tracking. After the first year of its development (funded in part by an NEA grant)

it was decided that it would be useful for other museums in Michigan. Through an NEA grant, the system was given to selected Michigan museums along with the hardware and dedicated leased phone lines for data entry.

By the end of the 1970's, imaging technology was making its way into museums in the form of analog videodisk systems. In 1979, IBM and MCA announced a videodisk product, as did Digital Equipment Corp. and RCA.

By the end of the decade, several museums began imaging experiments. One of these was the Peabody Museum at Harvard. Rus Gant, a consultant in the Boston area, worked with Dan Jones of the Peabody's Photo Archives to photograph and record images of hundreds objects. These were recorded on a video disc. Access was to be provided through a database, however, the project was not completed. Another effort in the Boston area was a project of the Museum of Fine Arts - Boston. This project recorded 2,000 images using DICSOVISION, the IBM/MCA product. This project was completed but the disc was not used.

In 1979, I received a fellowship from the National Endowment for the Arts that allowed me to travel to museums across the country to get a first-hand look at how collections information was being computerized. I visited four institutions where automation projects had been underway for sometime: the Arkansas Archaeological Survey at the University of Arkansas in Fayetteville, the Arizona State Museum at the University of Arizona in Tucson, the Museums of New Mexico in Santa Fe, and the National Museum of Natural History in Washington, DC. Each had taken a similar approach based on systems available in the 1960's and 1970's. Three of these were using SELGEM and one was using GRIPHOS.

One of the most striking problems encountered at each of these institutions was the labor-intensive task of data entry. The NMNH was the only museum using OCR technology to overcome this. Only one of the project managers that I visited in 1979 is still working in the museum field, this is Vince Wilcox who is now the director of the Smithsonian's Museum Support Center.

1970-1979

1970-Metropolitan Museum of Art holds second conference on computer and their potential application in museums
1971-Chenhall holds Archaeological Data Bank conference
1972-MCN incorporated as a non-profit organization in NY; National Inventory Programme (Canada) commenced
1972-Museum Data Bank coordinating committee formed (disbanded 1977)
1973-International Species Inventory Systems proposed
1974-MCN moved to SUNY @ Stonybrook
1977-Apple computer emerges from garage in Silicon valley

1977-Museum Documentation Association (UK) formed
1978-MCN abandons GRIPHOS as obsolete; Nomenclature published by Chenhall
1979-work begun on Art and Architecture Thesaurus
1979-Harvard Peabody Museum begins timesharing consortium with Boston's Children Museum
1979-DARIS
1979-IBM/MCA announce videodisk product
1979-DEC:IVIS system
1979-RCA announces CED videodisk
1979-Museum of Fine Art-Boston: photo videodisk project completed (2000 images - DISCOVISION -IBM/MCA)

The 1980's

The decade of the 1980's brought exciting changes to the area of museum automation. Desktop computers and improved storage devices became available early in the decade. Each year brought improvements and reduced costs. Advances were also seen in database products — as the desktop revolution began there were relatively few choices for IBM compatibles and none for the Mac. By the mid-80's the choices were greater and by the end of the decade, there were a number of stable database applications available for both platforms.

Museum no longer needed to depend on university application groups or special software consultant to write applications for them. Software written specifically for museum applications became available from companies that worked exclusively in the museum marketplace. One of these early applications was developed for the Dallas Museum of Art by Willoughby Associates, LTD in 1981. The resulting system was called MILAM.

In 1980, work was begun the Art and Architecture Thesaurus. The project was initiated by Toni Petersen, Patricia Moholt and Dora Crouch with a grant from the Council on Library Resources and a subsequent grant from NEH. The goal was "to build a consistent, comprehensive, and controlled vocabulary that could be used by database developers, but that at the same time would not conflict with the working language of the scholars and researchers who would be users of the databases."

In 1983 the AAT became an operating unit of the J. Paul Getty Trust,as part of the Trust's Art History Information Program. Work on the AAT continues. In 1990, the first edition was published by Oxford University Press. A second edition was published in 1994. The AAT is now available in several electronic formats which have proven to be even more popular than the print editions.

By 1982, fifteen museums in Michigan were using the DARIS system developed for the Detroit Institute of Arts. The data from each institution was held on the Burroughs mainframe at the DIA in Detroit. For the first six years, six people worked full-time doing data entry. Over the life of the system full records, eighty fields in length, were entered for one-third of the 56,000 DIA objects. Another third was entered with a boiler plate record, and the last third were represented by only catalog number, curatorial departmentand classification. The system was used until 1994 when it was realized that the DIA could no longer support the entire system. The "client" museums were gradually moved off the DIA system. A new system, The Museum System, was selected to replace DARIS. Each institution became responsible for their data and managing the new system.

In 1984, the first PC's were introduced and in use at the Smithsonian. In the same year, I acquired my first PC clone, a Zenith with 64K of RAM — for the Bureau of Historic Sites and Properties. The process of converting the mainframe database to a desktop system using dBase(began. Conversion was completed after I left the Florida Department of State, but systems development and data entry of new records continues.

The Museum Computer Network also changed during the 1980's. GRIPHOS was diagnosed as obsolete in 1978 but many members continued to use the system until conversion could be accomplished. Annual conferences continued but MCN could no longer be considered a "user group". In 1985, David Vance resigned as President of MCN and MCN left Stony Brook. The following year, the Board of Directors decided that MCN would become an individual membership organization. In the next few years, the evolution of MCN moved at a rapid pace. In 1987, the Board adopted the basis of the current mission statement and developed a five-year plan. In 1988, MCN hired a full-time director and moved to Syracuse University. During that year, MCN received grants from NEH and NYSCA. At the end of the decade, the MCN initiative called the Computer Interchange of Museum Information (CIMI) was launched. MCN received a PEW grant and later a grant from NEH to fund the initiative.

1980-1989

1980-MCN sponsors North American Planning Conference on use of microcomputers in museums
1981-CHIN formed from National Inventory Programme
1981-IBM PC introduced
1981-MILAM Collections Management Relational System developed
1981-Clearinghouse on Art Documentation & Computerization project begins
1982-Fla. Bureau of Historic sites and Properties stops using GRIPHOS, begins using Scientific Information Retrieval System
1982-1st Space Shuttle Mission launches 2 satellites
1982-15 museums in Michigan using DARIS
1983-U/Wisconsin, Helen Allen Textile collection database & videodisk project completed, 12,000 records, 23,000 images

1983-LOTUS 123 arrives, IBM PC sales soar
1984-Macintosh introduced, revolutionizes desktop computing
1984-1st PCs introduced & in use at Smithsonian
1984-Getty sponsors International Conference on Automatic Data Processing of Art History data and documents
1984-Getty launches Museum Prototype Project
1985-David Vance resigns, MCN leaves Stonybrook
1986-MCN decides to be an individual membership organization, total membership stands at 112
1987-MCN adopts current mission statement and 5 year plan; Conservation Information Network goes on-line
1988-MCN hires full-time executive director, moves to Syracuse University, receives NEH and NYSCA grants
1989-National Museum of American History data model accepted by CIDOC
1989-MCN launches Computer Interchange of Museum Information (CIMI) Initiative, receives PEW grant

The 1990's

Nicholas Negroponte, the Director of the Media Lab at MIT, recently wrote a book called Being Digital. He gives an overview of pioneering efforts and current trends in digital technologies. Importantly, he notes

There is a polarity (however artificial) between technology and the humanities, between science and art, between right brain and left. The burgeoning field of multimedia is likely to be one of those disciplines, like architecture, that bridges the gap. (Negroponte 1995:81)

This year represents the halfway point in the decade. It also marks a short time before the beginning of the next century. If we take a look at the trends of each of the last three decades, we see that in each case, there were important initiatives or changes in the field of museum automation that continued into or came of age in the following decade. As we move into the later half of the 1990's and the last five years of the 20th century, there are important initiatives to recognize, describe and follow. Using multimedia and networking technologies, these projects will be the bridges mentioned by Negroponte for the museum world.

Several of these started in the late 1980's like the CIMI project and the restructuring and revitalization of the Museum Computer Network. In 1992, MCN experienced a serious crisis. The Board held a planning retreat which resulted in minor changes to the mission statement and short-term and long-term

objectives. Most of these have been met in the three years following the retreat. MCN was restructured to include committees of the Board and the Program Office housed at the MIT Museum was created. MCN has emerged from a minor identity crisis to become a stronger organization.

In 1992, the MCN initiative known then as the Computer Interchange of Museum Information (CIMI) completed its work. A report was written by David Bearman and John Perkins which provided an overview of standards for the electronic interchange of museum information as well as suggesting standard protocols that would be appropriate for museums. In 1992 and 1993, CIMI began its evolution into the Consortium for the Computer Interchange of Museum Information. CIMI is now a "not-for-profit initiative to develop community standards that support the preservation of museum information in digital form and enhance the potential for information exchange"(Perkins, 1995). CIMI membership includes museum and industry partners such as Getty AHIP, the Research Libraries Group, the Canadian Heritage Information Network, the Eastman Kodak Company, Corbis Media (formerly Continuum Productions), the Museum Informatics Project at U.C.-Berkeley, the University of California Office of the President - division of Library Automation, the Smithsonian Institution-National Museum of American Art, the National Gallery of Art, Washington, DC, the UK Museum Documentation association, the RAMA consortium the Victoria and Albert Museum, the coalition for Networked Information, and the Canadian Museum of Civilization .

CIMI recently received funding from TIIAP and from NEH for Project CHIO - Cultural Heritage Information On-line. This is a CIMI project demonstrates the use of two international standards - SGML and Z39.50 - as enabling technologies to build integrated multiple media cultural heritage information resources and to make those resources available for search and retrieval over digital networks. (Perkins, 1995) Early results of this demonstration project will be shown at this conference.

Other important initiatives to know about and keep track of are those of the Getty Art History Information Program. These initiatives include: the Networked Access Initiative, the Imaging Initiative, the initiative for International Documentation Standards for the Protection of Cultural Objects, and the Intellectual Integration initiative. Also important is the work done by the Art Information Task Force which was a joint effort of Getty AHIP and the College Art Association. The Task Force was funded by the Getty Trust and the National Endowment for the Humanities. The result of this task force is a publication on structured categories of information used to describe works of art. A similar working group met as part of the initial work on CIMI to develop data models for Cultural History collections. Data models for collections have also been developed by members of CIDOC, the documentation committee of the ICOM.

The Museum Informatics Project at U.C.-Berkeley is another project looking at data models and methods of automation for collections of all types, in its objective of providing on-line access to information on all non-book collections at the University. The SMASCH project has developed a data model for botanical collections.

Negroponte also wrote,

Computing is no longer the exclusive realm of military government, and big business. it is being channeled directly into the hands of very creative individuals at all levels of society, becoming the means for creative expression in both its use and development. The means and messages of multimedia will become a blend of technical and artistic achievement. Consumer products will be driving force. (Negroponte 1995:82)

As we all know too well, museums do not exist in a vacuum. We are effected by the changes in the political landscape as well as trends in the computer industry. There are a number of general issues and trends in the political arena as well as in the computer and telecommunications industry that we must pay attention to as we move into the next century. One of the primary shifts that effects those of us in the United States, is the shift in funding for the Internet from the National Science Foundation to the private sector. In the last two years we have seen corporate mergers that are on-again/off-again as private corporations scramble for a bigger share of the telecommunication pie.

According to Nicholas Negroponte, "when bits are bits, we have a whole new suite of questions, not just the old ones like piracy. The medium is no longer the message." (Negroponte 1995:61) Some of the issues, topics and trends that we should be knowledgeable and pay close attention to in the next few years are:

Politics And Telecommunications

- Information Infrastructure

  interoperability
  platform independence

- Digital Vs. Analog Technology

  digital imaging
  the effect on intellectual property rights
  CD-ROMs and other electronic publishing

- Networks In General

  the global community
  the worldwide web
  search engines
  the use and potential of networks in distance learning

It will also be important to watch groups like the Electronic Frontier Foundation, the Coalition for Networked Information and the Internet Society and magazines and electronic publications like WIRED magazine and its on-line HOTWIRED version.

All of this changes the way we work, the way we think about, retrieve and present information on the objects in our museums and on the museums themselves. We may choose to commit to this path but in doing so, we must develop new models to protect our content, fund our projects and create information infrastructures to support technology projects.

1990-1995

1990-MCN moves to Pittsburgh, receives NEH CIMI grant
1990-Electronic Frontier Foundation founded
1990?-Museum Informatics Project - U.C.-Berkeley
1991-1st International Conference on Hypermedia and Interactivity in Museum (ICHIM '91)
1991-94-Art Information Task Force (AHIP, CCA with Getty Trust and NEH funding) reached agreement on structured categories of information used to describe works o art
1992-MCN Board holds Planning Retreat; restructures organization; develops short-term and long-term goals
1992-CIMI Committee completes work, Task Groups begin planning for data interchange
1992-Getty AHIP Networked Access initiative launched
1992-US elects Clinton/Gore
1993-MCN moves to MIT Museum, Board develops 5 year plan
1993-anonymous ftp site established for MCN information by David Bridge of the Smithsonian
1993-second International conference on Hypermedia and Interactivitiy in Museum (ICHIM '93) held jointly with the Museum Documentation Association conference
1993-National Information Infrastructure Agenda announced by Clinton administration (US)
1993-Getty Initiative for International Documentation standards for the Protection of cultural Objects
1993-Paleontology Museum at Berkeley publishes home page
1993-Dallas Museum of Art Gopher site launched with 25 images from collection (Public access database with 2000 images)
1994-MCN gopher site established by MCN Program Office
1994-MCN holds meeting with CIDOC

1994-Getty AHIP Imaging Initiative launched
1994-Harvard Peabody Museum establishes a presence for Harvard Museums on the Harvard VINE (Veritas Information Network)
1994-NINCH- National Initiative for a Networked Cultural Heritage
1995-CIMI Project CHIO announced
1995-MCN home page created at the AAM '95 meeting
1995-MCN registers Internet domain name (mcn.edu)
1995 Dallas Museum of Art Web page launched and linked to the gopher images
1995-Internet flooded with www pages; museum web pages published at an astounding rate
1995-Harvard Peabody Museum publishes home page; develops home page for linking all Harvard Museums
1995-MCN establishes a discussion list for members (mcn-l); announced at 1995 annual meeting

In closing, I would like to recognize the leaders in the area of museum automation in the United States:

MCN Board of Directors — the current members and past members including: David Bearman, Jim Blackaby, Susannah Fabing, Eleanor Fink, Lenore Sarasan; Tom Duncan of the Museum Informatics Project; early Smithsonian pioneers: Reg Creighton and Gary Gautier, and MCN founders: Jack Heller and David Vance and many others who paved the way for us.