

# Archives and Museum Informatics

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## LOOKING OUTWARD

This issue of *Archives and Museum Informatics* examines the potential impact of a U.S. military procurement policy on the world of archives and museums and reviews a number of software offerings developed specifically for our market. Oddly, the two are not unrelated.

The more I look at the software with which we are supposed to do our work, the more obvious it is that the improvements we desire are coming to us simply because the larger software marketplace brings them, not because our own archives and museums vendors are able to provide them. If we can have so little effect, it becomes critical to ask how can we position ourselves to take advantage of the most progressive developments soonest?

One strategy is represented by the CALS (Computer-aided Acquisition and Logistical Support) initiative which I have reported on sporadically in this newsletter in the past, and which this issue discusses in depth. CALS is a program designed to realize the promises inherent in the concept of an Open Systems Environment. A simple way of explaining CALS is to say that it is devoted to the electronic documentation of military systems and all their component parts, throughout their lifecycle from the design of the parts by one sub-contractor, to their assembly by the prime contractor, through delivery, maintenance, re-supply, repair and replacement. As such, CALS depends on communication of software independent representations material artifacts and the organizational and social processes by which they are related.

I was frequently asked why I was attending a recent conference on CALS. When I thought a museum example would help, I replied, "if you can represent a B1 bomber and all its social relations, I can represent a Conestoga wagon and its associations". When I thought an archival example would be more apt, I replied "if you succeed in establishing electronic communications between the military and its suppliers, between military services and between the militaries of different countries, all the rest of governmental transactions will be documented in electronic records very soon and we'll need to archive them."

Either answer also explains why this issue of the Newsletter examines CALS. If CALS succeeds it will

change your life indirectly by influencing software design and standards for open systems, and directly by defining methods for documentation of material culture and creating vast opportunities for electronic transactions between government and industry and within the commercial sector.

D.B.

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## LETTER FROM THE EDITOR

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Dear Michael,

As you requested, I retract my characterization of your questioning of the role which Nathan Benn's Electric Book Company is playing as an "accusation" that it was behaving too much like a wholesaler or software provider. I am pleased to accept your correction that your leading question in the public session was open ended, and that you are not sure that any given roles will be better or worse than others. I misread the concern you expressed in our private conversation that the roles which EBC wanted to play were not clear as a concern that it wanted to play what I regarded as inappropriate roles. I did not intend to suggest in the article that you agreed with me on the need for segregation between the roles being played by the various forces in the market, but will state clearly in this correction that you do not accept the concept that some roles might be inappropriate.

I, obviously, do think that specific role combinations should be ruled out. In particular I believe that only one organization should be established as a rights registry and that such an organization should avoid playing a proactive role as a value added wholesaler or retailer of images. I now understand that you feel that the market will sort out such questions. Mea culpa.

You and I do agree, as you put it in our phone conversation yesterday "that companies need to be stating specifically what they are proposing" and that institutions such as museums, libraries and archives "need to be more informed about what they want to do" in the image marketplace. My intention in the piece in the Fall issue was to suggest some definitions that could sort out these roles. I'm extremely pleased that you could say that "from that point of view, I found your distinctions about roles useful". If the continuing discussion helps to clarify what roles exist and which are appropriate for institutions or individuals owning rights and which are useful and needed for companies acquiring licenses, I believe we will be better off.

Sincerely yours,

David Bearman



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## INFORMATION RESOURCE MANAGEMENT IN KENTUCKY STATE GOVERNMENT

by Charles Robb  
Kentucky Department for Library and Archives

Since 1985, staff of the State Archives in Kentucky have been talking to other agencies about information resources management in our state, about what the responsibilities of various agencies were going to be, about the policies and procedures that were needed, and what tools could assist the process. As I describe the extent to which that management has been accomplished, I hope you realize that staff from the State Archives do not claim to have driven this process because that is simply not the case, nor is that even doable. What I hope to provide is some guidance on how to jump on the train if it turns out to be leaving the station or more importantly how to get a vehicle created when none seems to exist.

My working assumption is that information resources management is a shared responsibility accomplished through the efforts of senior administrators, fiscal officers, data processing staff, program managers, librarians, records managers, and archivists, but IRM in Kentucky began pretty much as it did in other governments it seems to me, as a mechanism for reducing or at least controlling agencies' data processing expenditures. Kentucky has a legislative subcommittee overseeing data processing in state government which, in 1984, established the Kentucky Information Systems Commission, with what was at first somewhat vague authority to plan for the management and growth of computerization. This Commission drew its members from many of the agencies represented, interestingly, on the State Archives and Records Commission; these included members from all three branches of state government and included reps from the auditor's office, the office of the attorney general, administrative and budgeting people from the governor's office, etc., and was chaired by the Commissioner of the Department of Information Systems. It is important to note that the latter department was itself established in 1982 as a central unit to oversee data processing for executive state agencies. From its creation, a representative from the Department for Libraries and Archives, my agency, has been included on the Commission.

The Information Systems Commission spent its first two years basically trying to define the most effective means by which it could do meaningful work. Critically important to my agency during that period were discussions in the forum provided by KJSC and directly with the Department of Information Systems, of the joint work we

were undertaking in the course of our NHPRC-funded Machine Readable Records Project, which was initiated with the support both of the Commission and of the Department of Information Systems. Many of you may be familiar with the basic goals of our grant, but for those who are not, the project represented my agency's efforts to adapt its records management policies and procedures to the environment of electronic records. A key feature of the project was development of a mainframe data dictionary which, it was assumed, would provide an inventory of state agency databases and electronic files. I want to speak briefly about the data dictionary at this point and then return to it under a fuller discussion of some IRM tools we continue to develop.

We can take the Machine Readable Records project's data dictionary development as an early instance of archivists trying to involve themselves with traditional systems analysts in the design of a system whose function quite definitely had archival purposes. Since we did not get the kind of online inventory that we wanted from the data dictionary, it might be judged that we failed in that effort. At the same time, what was accomplished was that our staff's discussions with DIS about the data dictionary forced us to define the role we wanted to play as archivists, so that both systems analysts and senior management at the Department of Information Systems could understand that role. This eventually led to an agreement between the two agencies that the functionality we desired to have in the data dictionary -- the long and short of which was to accomplish the tracking of files across their entire life cycle -- would be accomplished instead by several tools -- the data dictionary, a second database called the public records management system, and, lastly, a locator tool to disseminate information about these wonderful records and databases and how to use them.

At another level, KISC staff began preparing to undertake a broad strategic information resource planning initiative, and for that hoped to establish an information policy which would guide the management of all state agency information resources. My agency, which is comprised of librarians, records managers, and archivists, did not much like the initial policy drafts proposed by Commission and DIS staff. Our major concern was that the drafts failed to recognize that specific statutes gave our agency responsibility and authority to manage records for certain purposes. As a result of the fact that Donald Marchand, the theorist most revered by our data processing compatriots, did not call information itself a resource, we had heated discussions about whether information was an asset or a resource. I never have understood why that distinction had to be made, but the important thing is that we did not want to see our records management or our archival authority diminished. We talked and we argued, and eventually agreed upon a policy that no one was very happy with but which left everyone with new and proper sensitivity to the perceptions and responsibilities of others. We refer to this policy officially now as "our first attempt to draft an information policy." The entire process did not seem very productive at the time, but its result was that we don't have to define over and over what

we are trying to accomplish in our dealings with DIS. (We still have to do that with agency staff, but not with the people we normally deal with at DIS.)

Armed with an agreed-upon information policy and an initial set of hardware, software, and telecommunications guidelines it named the Kentucky Information Systems Architecture, KISC obtained the authority in 1986 to implement strategic planning requirements for all state agency data processing. KISC required agencies to name information resource managers who were charged with preparing biennial plans spelling out their automation expenditures. The plans were to be written by agency automation teams which included senior managers, data processing personnel, and records officers. Plans included statements summarizing the missions and functions that agencies are statutorily authorized to perform, detailed budgets for each automation project that agencies either maintain or propose to initiate in the coming two years, and documented compliance or non-compliance with the information systems architecture guidelines. Agencies were also asked to include in each project description statements detailing the impact on record keeping requirements that might be felt should a project be implemented.

The first planning cycle saw staff of the Commission reviewing approximately sixty information resources plans submitted by state agencies. Staff from DIS, Libraries and Archives, the Governor's Office of Policy and Management, and the Legislative Research Commission all reviewed these plans and were provided a clearer picture of the systems being maintained or contemplated in state agencies than had ever been available to any of us. Review of each plan included face-to-face meetings of Public Records Staff, the DIS analysts assigned to specific agencies, and agency data processing staff, who more likely than not, had been the chief contributors to the plans. In that first 1986 go round, the major thing we were saying to agency representatives was that there were records in their systems that needed in many instances to be scheduled -- fairly unsophisticated stuff, admittedly, but at the same time, an unprecedented opportunity for staff of our agency to begin raising the consciousness of agency DP staff about the fact that management of the information resource is not limited to the owner/custodian frame of reference they were used to. It was also an opportunity to raise our own consciousness about the challenges that actually working out dispositions for automated systems would pose.

We did several other things with the information gathered from agency plans. As I mentioned, our early efforts to make the data dictionary be a comprehensive and useful container of information documenting the electronic databases of state agencies failed, but we were able instead to begin building our own database of descriptions about information holdings in a database called the Public Records Management System. By digitizing series descriptions our records analysts and archivists were preparing in the course of scheduling records through routine records analysis, and then extract-

ing information in the agency information resources plans we reviewed, we built a database describing approximately 600 systems that is sufficient for us to establish new and more appropriate scheduling priorities and to create clearer and clearer pictures of the documentation that is potentially available to us as we return to agencies to update record schedules. By comparing and relating these system descriptions to the approximately 8,000 separately scheduled series that have been adopted over the last ten to twelve years, we are able for the first time to appraise with the kind of view that archivists must have to make meaningful decisions about what is best to keep and best to discard.

All of this information came to us during the first biennial planning cycle; we went through another cycle two summers ago and are in the midst of a third one right now. In the current cycle, state universities have been added to the net, meaning that entirely new information resources are being described this time. In the coming months, we'll be in our "these are records" mode with university staff during review of their first IRP submissions.

As importantly, in the current planning cycle, agencies are able for the first time to submit automation project descriptions from their plans in electronic format, using diskettes that were distributed with plan instructions. KISC staff have divided the information they are seeking into more discrete data elements, with the result that their ability to summarize and manipulate the data gathered is substantially improved. Data from plans that our staff once had to key into our internal database is now being compiled on a file server at the Department of Information Systems. In the next planning cycle, the entire agency plan, including agency mission statements, should be keyed by agency staff.

I should say I found this fact a bit discomfiting at first, because like most archivists I have a proprietary attitude toward the materials I collect, even when, unlike many archivists, I collect meta-data rather than data itself, in most instances. But since I have been added to the list of users who can review and update information in this planning database over a network that will be linked to my department within a matter of weeks, I really don't mind that the data is not in my hands. I am actually hoping that use of the several different software packages employed for the administration of this process will cause enough conflicts that it becomes more apparent to DIS and to KISC staff that all of this information, including what's in the data dictionary, should be in more sophisticated distributed relational format that would more fully capitalize on the value of what we're holding.

I mentioned earlier that a third tool has been part of KISC's and my department's strategy since early in the machine-readable records project, that tool being an on-line locator of information about systems and manual files. It has been an abiding goal to combine and make broadly accessible systems information from the central data dictionary, information provided by the strategic

planning process, and information gathered in the course of the identification, description, and appraisal of record series, through electronic means. I spoke in somewhat more detail and probably more lucidly about this at last year's NAGARA session, but I want to mention again that Library and Archives staff have undertaken and recently completed work with Department of Information Systems staff on a menuing structure and agency name and subject authority files for a system called the Commonwealth of Kentucky Information Retrieval System or C-KIRS for short, by which we mean to disseminate much of the information I've been describing today, and most particularly summaries of agency functions, system and file descriptions, lists of archival holdings, and so on, over the ever-expanding statewide system. The software package chosen for this is a Digital Equipment Corporation product called Videotex, whose specialty is its easy to use interface and whose Achilles heel may be lack of sophisticated subject searching capability. Databases that my agency is helping construct will be available through the same interface and software as those being built by our state's Department for Environmental Protection to provide public access to lists of toxic waste sites, and the Department of Personnel which will post job opening lists. I am both excited by this tool and gratified that my agency made the latter two databases more accessible through our contributions in the area of vocabulary control and subject indexing.

So, I consider that some good things have happened in the course of our working out a role for ourselves in IRM. While there were some things which we did not accomplish in the past six to eight years -- you may have noticed that I am not dwelling much on scheduling coups, or the numerous databases we have brought under our control -- I would contend that we have taken proper advantage of the opportunities we should have. What is most important to me is that we have at least partially gotten out of the mode of telling the data processing community what is wrong with their management of information and into a mode or a relationship that allows us to make contributions that everyone sees are contributions. Being on the can-do side of this argument for once seems pretty nice.

C.R.



*Robb's paper, as it appears here, is a barely edited version of an informal talk he gave at the 1991 NAGARA Conference. I asked him to allow me to print it because I think the creativity of the small staff of the Kentucky project demonstrates some of the ways that public records officers could be pro-actively involved in the electronic records arena. I welcome contributions from others with interesting case studies.*

the Editor

## INTRODUCTION TO CALS

CALS is a program to implement Computer-aided Acquisitions and Logistics Support for the U.S. Defense Department, which was launched four years ago. The concept is simple. It is often depicted as simply reducing the bulk of documentation of military system by delivering it in electronic form (the documentation of most aircraft is so heavy that they can't take off if it's all on board), but it is much more than simply changing the form of documentation.

The overall program is designed to implement open hardware systems, and make possible the purchase of more commercial off-the-shelf software, by gaining adherence to a comprehensive suite of standards. The strategy is to integrate the technologies employed in the design, manufacture, delivery, training, operation and maintenance of equipment by adopting standards for interchange of information between systems controlling each phase of the life-cycle of the equipment. The tactical framework for the integration is an elegant model of open systems standards incorporating OSI layer 1-5 (GOSIP) protocols for communications and data encoding with presentation (layer 6) and application (layer 7) standards.

This degree of integration based on information interchange required the military to identify applicable standards, and in some cases to develop standards that were missing. The level 6 standards incorporated into the CALS standards suite include SGML for text, CGM for graphics, "HyTime" for hypermedia, CCITT Group 4 and Tiled Raster formats for raster images, and IGES for CAD/CAM vector data. Application protocols are being defined as standards, and concrete procurement specifications, to support a variety of specific programs. These programmatic initiatives are known in U.U. military parlance as Contractor Integrated Technical Information Service (CITIS) based on Automated Interchange of Technical Information (MIL-STD-1840A) and the ISO IRDS Standards, Electronic Data Interchange (EDI) using ANSI x.12 and EDIFACT, Interactive Electronic Technical Manuals (IETM), Product Data Exchange using the "STEP" standard (PDES), and Concurrent Engineering (CE).

In a separate glossary, I have defined these terms and identified the standards which they invoke. The larger concept is to exploit existing OSI standards and define new application profiles in order to achieve the programmatic aims of a market. The method by which the CALS initiative is that the customer (the military) has identified functional requirements for data interchange, and is working cooperatively with the industry (through technical task forces of industry consortia) to define an architecture which can be incorporated into procurement specifications. Because the military is the largest customer in the world, and because it has immense technical expertise of its own, they could have simply issued specifications as they generally have in the past. What makes CALS so im-

portant is that they decided instead to provide a strong incentive for the development of open systems environments by relying on international standards. In the process they have pushed the implementation of some complex data interchange standards (such as those for vector graphics and hypermedia) forward and have developed methods for defining application portability profiles that will contribute to a fundamental restructuring of manufacturing and of customer/vendor relationships in the next decade.

What is envisioned is that the government would issue an electronic bid, that vendors would submit electronic proposals, and that the government would issue electronic orders, using EDI. The vendor design teams would share electronic designs in IGES, drive remote manufacturing equipment based on Concurrent Engineering (CE), and provide the government with access to corporate documentation in SGML under the CITIS program. The documentation would include Product Data Exchange using STEP (PDES), which includes all necessary information about processes, including quality assurance and maintenance, as well as the actual deliverable. The government might also procure documentation in the form of Interactive Electronic Technical Manuals for in-house maintenance and repair. If it was fully implemented, such a system would not only transform the military procurement process and governmental transaction records, it would revolutionize the entire commercial sector.

The potential of CALS to transform the way business is conducted, not just with the military but with all customers worldwide, has not been lost on American industry. One reflection of the importance which industry attaches to CALS is the role that industry consortia are playing. Industry consortia in the standards area are a way of developing interchange and interoperability capabilities without risk of anti-trust action and with greater resources than any one company could devote. They are rampant in the CALS arena and may, in fact, be the predominant means for making of progress.

Five major industry consortia were in evidence at CALS '91. In order by their age, these were: the Microelectronic and Computer Technology Corporation (MCC) formed in 1982, the Industry Steering Group for CALS formed around 1987, the SQL Access Group which was created in 1989, and PDES Inc. which dates from the summer of 1990. Each of these consortia has members which are information systems companies in the relevant market and which by joining a third organization can pursue activities regarding standardization which would likely be considered restraint of trade if they did it on their own. In joining, they contribute funds and/or personnel, usually to a specific project of the consortium in which they have a stake. Each consortium is advancing one or more standards through research and testing. Fees for membership range from \$50,000 - \$500,000 per year in addition to the donation of staff, so it is evident that the member firms consider these organizations to be strategically essential.

□

## A CALS GLOSSARY

**ANSI x.12 and EDIFACT** = The U.S. national standard for Electronic Data Interchange, as defined by ANSI X.12 is still accepted for use within CALS but the stated DoD direction is that EDIFACT, the international EDI standard, will be the future basis for business transactions data. Military EDI under X.12 uses the Product Specification Transaction set (#841) which allows for interchange of a binary file, such as raster data, within an EDI transaction.

**CCITT Group 4 and Tiled Raster** = the upper end of the fax protocols for raster images at 300 dpi and the NIST 88-4017/FIPS 146 standard for Tiled Raster data. These two approaches to raster interchange are different from the ISO 8613 ODA/ODIF standard which uses ASN.1 encoding but all three approaches are permitted under the MIL-R-28002 specification.

**CGM** = Computer Graphics Metafile (ISO 8632) is a well established standard for interchange of raster graphic images.

**CITIS** is sometimes referred to as "CALS Phase 2" although officially there are no phases in the CALS implementation. The reason is that there is a tremendous legal and operational gap between the provision of information and the provision of access to corporate databases. CITIS is based on the Defense Acquisition Management Policies and Procedures issued 23 February 1991 (Part 6 Section N) which reads "in general, preference shall be given to contractor information services and online access instead of data deliverables. Where data delivery is required, preference shall be given to delivery in machine-readable digital form rather than paper whenever feasible . . . unless clear and convincing analysis shows this not to be cost-effective when assessed across the life cycle."

**GOSIP** = Government Open Systems Interconnection Protocols (Federal Information Processing Standard, or FIPS, 146) is those standards from the International Standards Organization OSI model that have been adopted as basic requirements in all Federal procurements. These include such communications protocols as x.400 and x.500 for e-mail and TCP/IP for network connections.

**HyTime** = the popular name for Draft International Standard 10744 which uses SGML concepts and ISO 9070 Public Identifiers for content names to extend the idea of content markup to hypermedia link types. HyTime is one of two hypermedia standardization efforts, the other of which, known as MHEG (JTC1/SC29/WG12) is working on standards for the physical interchange of the information content of multimedia and hypermedia along the lines of its sister committees JPEG and MPEG which recently drafted proposed standards for still images and motion images that appear to be on their way to ratification.

**IGES** = Initial Graphics Exchange Specification which is defined in ANSI 14.26M (IGES 3.0), ASME Y14.26M (IGES 4.0) and NBSIR 88-3813 (IGES 5.0) and implemented in MIL-D-28001 which identifies discrete subsets of entities in CAD/CAM data that can be interchanged. The broader standards allow for interchange of 2-D, 3-D and surface model data the translations from one system to another may still be incomplete because the two systems use different entity sets.

**Information Resources Directory System (IRDS) and the ISO Reference Model for Data Management (DIS 10032)** = These standards define the tools and techniques for modeling processes, data flows and data in information systems and organizations. One of the major challenges of CITIS and PDES will be to extend the models from data to process.

**PDES/STEP** = ISO 10303 application standards of ISO TC 184 SubCommittee 4 of which the first 10 (of about 40) parts are out for ballot and 2 have been achieved DIS status. These are process models written in the standard language EXPRESS which is an extension of the current standard IDEF1 and IDEF1x modeling languages. The STEP Document Architecture overview (part 1) and the EXPRESS language (part 11) are part of the Draft International Standard itself. These standards are all several years away from widespread implementation.

**SGML** = Standard Generalized Markup Language (ISO 8879) is a software independent method of delimiting the structure of data for interchange purposes which was developed for print publications but is equally applicable to the content definition of any interchange file.

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CALS '91 OVERVIEW

The CALS Expo '91 was attended by about 2200 people who had an opportunity to sit in on eight half-day seminars, three half day plenary sessions and 36 concurrent programs in nine tracks. Most also trudged through the more than 100,000 sq.ft. of exhibits which were open until 8:00pm., capping a twelve hour work day. Why would they, or I, put up with all this mental and physical exercise on behalf of Computer-aided Acquisition and Logistic Support? Simply because CALS is the most important open systems initiative and integration through standardization project ever undertaken, and because the amount of money behind it gives it a fair chance of success.

Clues to the importance of CALS could be gleaned from the fact that the Undersecretary of Commerce and an assistant secretary Defense gave plenary addresses and were joined by the Chairman of the House of Lords Defense Committee and a slew of Major Generals, Admirals and other high ranking military officers. Their testimony was that U.S. and foreign governments are endorsing the aims and achievements of the CALS initiative, and that they are committing funds and implementing regulations, that will make it happen. If professing such support did not sway the audience, then the addresses by leaders of a number of industry collectives to which major U.S. corporations have donated over 1000 full-time researchers and millions of dollars of support should have suggested that something more concrete than mere assertions of the benefits of cooperation is going on here. But the longterm impact of CALS was still not entirely clear, even if some impressive short term returns were already evident.

SGML compliant software for every size and make of platform was prominent on the exhibit floor and data interchange involving text, graphics, images and even CAD/CAM was being demonstrated live on the exhibitions' own 1.5 mile network, but the transformation of the business culture which CALS was supposed to bring was much less apparent. Instead what I saw looked like the replacement of paper by electronic datafiles. Four newer, and more radical, CALS developments such as Contractor Integrated Technical Information Services, Product Data Exchange using STEP, Interactive Electronic Technical Manuals and Concurrent Engineering - seemed to be hard for both attendees and exhibitors to fully grasp.

My objectives at the meeting were to determine the degree to which the suite of protocols and standards in the CALS architecture was adequate and ready to support museum data interchange, and to assess the likely impact of CALS on the worldwide implementation of SGML, EDI and ODA/ODIF.

I spent the first day of the conference at a series of half day workshops. The Introduction to SGML workshop was very basic and heavily oriented towards the military specification, so I spent only a little time there. A workshop on Implementing an EDI Program was more useful to me, especially the overview by John Gatesman of the functional capabilities of Value-Added EDI networks. In the end, Gatesman advised that the differences between the networks would come down to different pricing structure and that since potential users would have too little experience data initially to determine which pricing mixes were best for them, they should just start up and use one of the VAN's for the first six months, and then put out a bid for the mix of services they find they actually use. Other workshops included an "CALS 101", "Concurrent Engineering", and "CITIS - Implementation of CALS Phase II". I estimate that about 500 participants attended at least one of the eight workshops.

At the opening Plenary session, Colin McMillan, Assistant Secretary for Defense, emphasized the commitment of DOD to CALS as a strategy for reducing costs and improving quality in an era of reduced defense expenditures. Robert White, Under Secretary of Commerce saw CALS as laying the groundwork for 21st century manufacturing and was especially enthusiastic about Product Data Exchange using STEP. Avis Melissarantos, Director of Quality Control for Westinghouse, explained CALS in terms of just in time delivery and quality control. It was clear that there is something in CALS for every technocrat!

The next series of plenary talks featured Major General Russ Baldwin, the director of a newly formed Joint CALS Management Office within DoD. The first product of the new office, the CALS Architecture, which resulted from mobilizing over 100 experts from April to June 1991, was much in evidence throughout the rest of the conference. Retired General "Stormy" Stormfeltz who conceived CALS and now heads an Industry Steering Group for CALS, noted the evolution of the concept from that of automated documentation to life-cycle integration of systems. Stormfeltz indicated that industry was ready and able to send data now, but the government is unready to receive it. It was hard to judge during the conference the extent to which industry was in fact prepared, but it was clear that outside the few innovative programs which were consciously spearheading the movement, the government had not yet begun to receive large quantities of CALS conformant data.

I was also struck by the absence of an international perspective despite its prominence in the CALS ideology and the impressive quality of the showing by foreign firms in the exhibition. In the one session I attended on international developments, an audience of only 25 consisted almost completely of members of the track organizing committee and speakers in subsequent international track sessions (other sessions attracted an average of about 150). At this session, Martin Palmer, chair of both the

NATO Committee for CALS and the four powers CALS group emphasized the potential of CALS Phase II (as the move to life-cycle integration based on Product Data Exchange, Concurrent Engineering and Interactive Electronic Technical Manuals is often called) to transform the way everyone does business. As such, he noted, it was a critical issue for the next round of GATT talks, because if the U.S. goes down the CALS road alone it will be establishing an unprecedented trade barrier. International policy mechanisms will have to be developed including new concepts of property rights and contract law to enable the sharing of intellectual property, such as designs, and their residence in distributed databases in different countries. He concluded by calling for a World CALS Expo along the lines of the World Postal Union negotiated in 1906.

Keith Blacker, Director of EDI products at Lucas International and chairman of the UK EDI groups, noted that his firm (like others), must communicate with its customers by their preferred methods. Currently each customer prefers a different method, which in Europe tends to be EDIFACTS or proprietary EDI. Obviously it would be advantageous to standardize, but the real problem, he suggested, is not in communication protocols but in development of shared process data models. For the dialogue to work, both companies need to have a shared model of the process, assuring the data quality and availability essential for concurrent engineering in secure supplier relationships. Michael Goldie of Vickers Shipbuilding and Engineering Ltd, saw CALS as a continuation of a business trend towards greater modularity in naval procurement over the past twenty years, but noted that CALS had not, and probably would not, change business practices in an industry that is characterized by long lead times, low volumes, limited competition, and a high dependence on a very few specialty suppliers with the rest of supplies coming from a wide base of suppliers for whom this industry is a minor customer.

John Berge, Director of the European Commission program on EDI, of the UK Simpler Trade Procedures Board, and the author of EDIFACT, presented a paper which was written as a formal EEC contribution. In losing his personal reflections on the state of EDI, the conference gained an important strategic statement that EDI is central to the achievement of a European market by 1993 and is perceived as useful for day-to-day government administration and even taxation. An EEC/EDIFACT message center is being established in Brussels to store all European message definitions. Selection requirements and performance tests are being defined to include interactive EDI standards as well as inter-networking requirements. Work is proceeding on harmonization of national laws so that EDI becomes common business practice. The official position is that EDIFACT is the international standard and that the "alignment" of ANSI x.12 with EDIFACT, by U.S. government participants, is "being welcomed". In discussions afterwards, it was clear that Europeans are considerably annoyed that the US has still not adopted EDIFACT.

Two strong messages were conveyed by this session: 1) the existence of national, rather than international, standards in this arena would create, rather than reduce, trade barriers and 2) the development of international standards depends on continuing, financially rewarded, leadership by the military as a customer in each country and internationally.

I heard a fear on the part of the internationalist boosters of CALS and EDI that the negative scenario might be coming about, in part because the trade policy requirements of a successful transformation of the business information environment are not well understood or appreciated.

The second Plenary session, chaired by Marianne Pietras, the Deputy CALS Executive in DoD, was intended to demonstrate cooperation between vendors and governments internationally. The lead speaker, Jack Makeen, the newly appointed Vice-President of Government Systems at DEC, argued that CALS is necessary to redesign the work process for the 21st century which will be characterized not by mass production but by mass customization. While it will be complex to achieve, the challenge will be to assimilate, more than invent, the technology for open systems. Makeen stressed that DEC does more than half of its business internationally and that it sees the international realization of CALS as critical to its survival as a firm.

Makeen was, appropriately, followed by Lord Chalfont, chairman of the House of Lord Defense Group and of the CALS Industry Council of the UK who reported that in an informal poll of his peers on the House of Lords Defense Group (the rough equivalent of a Senate Committee) only one other member knew what CALS was. At the same time, he reminded the audience that in 1993 the European economic area will be the largest market in the world. He expressed deep concern that the U.S. didn't realize that CALS would not be viable if it did not include Europeans fully and urged a more internationalist stance.

As if oblivious, the next speaker, Deborah Wynne-Smith (Assistant Secretary for Technology Policy of the US Department of Commerce), launched into what I can only categorize as a Fortress America talk, complete with a celebration of Desert Storm and ritual Japan bashing. In the process she pointed out that US companies are better at creating new technologies than in bringing them to market (which she explained as U.S. firms trading intellectual property to the Japanese in exchange for capital). In conclusion, but contradicted by everything she had said before, she endorsed Lord Chalfont's position that international cooperation would be necessary.

In the second set of concurrent sessions, I elected to attend programs on distributed databases and the role of the data dictionary/data directory system. The speakers presented the implications for CALS of the "three schema model" (Internal = the way the system sees the data; External = the way the user or receiving system sees the data; Neutral = the interchange definition of the data).

The neutral schema is defined by functional, technical and data standards, each of which was addressed by one speaker reporting on the work of the CALS Directory/Data Dictionary Task Force which had been formed in January 1990. Bob Kidwell addressed the functional requirements for the D/DDS including such issues as support for configuration management and version control, support for distributed, dynamic, heterogeneous environments, rules for location of data, routing, integrity coordination, and access logging. Rodney Heisterberg mapped the technical requirements of the DOD acquisition guidance 5000.2 to the four levels of the CITIS (Contractor Integrated Technical Information Services) specification: 1) Automated accession and search, 2) predefined query, 3) ad-hoc query, 4) contractor applications. In effect, they see the DoD as contracting for data of five types: data elements, relations, schema, product models, business models. In this context they have extended the ISO Reference Model for Data Management (DIS 10032). The final paper, by David Jefferson of NIST, explored the data standards required by the Open Systems Environment. These standards form the basis of the Applications Portability Profile using IRDS as the metadata interface, SQL to manage metadata tables, x.500 to manage directory services and an extension of SQL called Remote Database Access (ISO DP 9579) to conduct queries. Jefferson emphasized that all users must share a single external schema including both data and business rules for interchanges to be successful. The first step in this, he argued, was for corporations to develop their own conceptual schema's which could then be mapped into shared external schemas.

On the final day of the conference, I attended two sessions on automated publishing. The first focussed on SGML while the second was devoted to "advanced concepts". Bob Barlow of AGFA Corporation opened the first session with a discussion of the phases in planning for a SGML publishing environment. Mark Gross reported on his experiences as director of a data conversion service which can be summarized as 'most pages of most documents are automatically convertible because most conversion problems reside in a few of the pages'. He urged full analysis up front. Jim Mason discussed plans at the Department of Energy which has adopted SGML but recognizes that it cannot replace all existing word processors and desktop publishing systems with SGML authoring systems and has established plans for conversion of documents immediately after they are created recognizing that much tacit knowledge of content will otherwise be lost. Paula Angerstein discussed the logical criteria for output specifications which consist not only of the element type (tag) but also of context of occurrence of the tag and the data values in the tag (which she called conditions). For each such logical type, variables in the output can be font, leading, positioning, new lines, new pages, etc., and constants such as auto-numbering, revision symbols, etc. The Syntax of the notation may be SGML but the semantics of the notation (style sheets) assure that no output specification will produce exactly the same result from two different systems. John Gawkowski defined what he has identified as requirements for an SGML

Document Management System, of which the most important was that it handle textual data and criterion data (data on which one wants to perform database-like operations) separately.

In the second session, Brian Caporlette presented a data model for interactive multimedia publishing systems in which the DTD and FOSI associated with print publications are replaced by Data Object Definitions and Interactive Presentation Rules. The generic data Content Data Model (CDM) provides for definition of primitive node types (text, table, graphics, audio, video, process, etc.), referencing and linking mechanisms, context dependent filtering, user interaction and branching. The CDM is an interchange specification rather than an implementation. Brian Markey of DEC discussed the emerging HyTime and MHEG standards. HyTime is, logically, an extension of SGML to multimedia while MHEG is essentially an extension of JPEG/MPEG to interactivity. HyTime grew out of applying SGML to musical notation where the real-time duration of a half-note is relative, based on the duration of other notes. In Standardized Music Description Language this kind of relational problem was solved by a kind of referencing which became the basis for Draft International Standard 10744 as the draft standard is officially called. HyTime uses the !Notation syntax, ISO 9070 Public Identifiers for content names, and data types (including MIDI data) defined in an annex to the standard. MHEG is a standard for low level encoding of non-revisable objects to be accessed in real-time. It uses ASN.1 syntax and is oriented towards content handling rather than logical markup.

Paula Angerstein followed with a paper on the DSSSL Processing of Object Information. If markup indicates the boundaries of objects, processing information is essential in order to know what to "do" with them (e.g., semantics). The options for associating processing information with data content are to embed it (as in markup) or to provide an external specification, which is the intention of the DSSSL (Document Style Semantics and Specification Language, Draft International Standard 10179). The design goals for the DSSSL are to provide an unambiguous association of processing information with source documents with extensible semantics and the ability to interact with external processes to handle non-SGML encoded data. The areas of standardization include indirect addressing into the data, general transformations (replication, suppression, aggregation etc.) and processing semantics (conditional processing, event processing, etc.). The DSSSL was not designed to specify user interactivity although the committee imagines that semantic specific processes could be added for user interactivity and is now working on it.

Eric Jorgensen of the David Taylor Research Center reported on a Tri-Service working group which is developing a joint specification for Interactive Electronic Technical Manuals (IETM's) which is expected to be approved by the end of FY'92. The specification, in three parts, defines 1) the general content, style, formats and user interaction, 2) revisable source data (using HyTime and

multiple content specific DTD's), and 3) quality assurance. Potentially this specification could greatly influence the future of interactive multimedia products if the military turns out to be a major customer for them.

Perhaps the most intriguing paper in the session was one that questioned the need for IETM's. Jim Giles of the Logistic Management Institute reported on a study of user requirements conducted to develop a business case for interactive technical manuals. They discovered that the repair maintenance task which IETM's are supposed to assist is itself disappearing in the face of highly reliable systems, diagnostic tools built into systems themselves, and modular replacement of components which are being furthered by CALS. They envision a future in which the technician who seeks maintenance history data, technical manual information, test equipment, up to date supply data and information from the weapons system to make a repair (which was the model that led to the IETM concept) is replaced. In that future, parts are so reliable they are discarded when they go bad and the repair environment is more like an assembly plant. The weapon system data, its test equipment and its maintenance history are all in one memory which dictates what parts are to be replaced.

I find just such long-term interaction effects in which evolving capabilities for information transfer so utterly transform the organization of work as to make themselves unnecessary the most exciting prospect. How, I ask myself, could the complete interchangeability of representations of material objects transform the relationship between museums and the clients?

## THE CALS '91 EXHIBITION

For those of us outside the military, the real test of the CALS concept is in whether it produces commercially available software for open systems. On this score, I felt the CALS '91 exhibition demonstrated significant impact. In addition to a number of very impressive, very costly, end-to-end integrated systems developed for specialized military applications, the exhibition included several inexpensive SGML authoring environments, a number of promising automatic tools for conversion to SGML, several interesting presentation systems that created hypertexts from SGML marked data, a variety of low cost EDI solutions, and at least one inexpensive data modeling tool.

SGML authoring environments have definitely improved over the past two years both in the features they offer and the interface they present. Two years ago the two systems I was acquainted with had "typesetter" friendly interfaces and managed textual data only. They could hardly be given to end-users used to much more powerful and friendly word processing systems. The systems displayed at CALS'91 remain slightly less pleasant than latest generation word processors but they have functional capabilities based on SGML built in which more than

make up for these user interface limitations. All the systems I report here come with the AAP and military DTD and will permit any "arbitrary" DTD to be defined. They will all output SGML tagged text and print to Postscript printers.

ARBORTEXT INC., [535 West Williams St., Suite 300, Ann Arbor, MI 48103, 313-996-3573] showed SGML Editor, SGML Publisher and Document Architect, their authoring, publishing and DTD development modules. SGML Editor presents the user with a template based on the DTD into which the user may type text. It imports TIFF, CGM, IGES, and CCITT G3/G4 images and permits the user to place them where allowed by the DTD, but provides no tools for editing them and displays only the pointer. It imports database files into tables defined in the DTD and allows editing of those tables. It lacks any generalized retrieval or display tools beyond word searches and table of contents type displays. The basic contribution it makes is real-time SGML parsing against the DTD. ArborText also sells Equation Editor and Table Editor products which support these special types of data entry. ArborText products currently run on the Sun under X11 and cost \$3-5,000 each and are to be released soon to run on HP's under MOTIF.

AVALANCHE DEVELOPMENT COMPANY, [947 Walnut St., Boulder CO 80302; 303-449-5032], offers FastTAG, a tool for automatic conversion of word processing files, output from ASCII, OCR/ICR files, and typesetting files to SGML, a variety of Page Description Languages and Desktop publishers, typesetting languages and DBMS formats. The tool was widely in evidence at a number of booths throughout the exhibition where services or end products were being offered, although Avalanche itself did not exhibit. Users seemed highly satisfied with the product, which runs under DOS, on the SUN and on Vax's and some were reselling it bundled in their own software tools.

ELECTRONIC BOOK TECHNOLOGIES, [One Richmond Square, Providence RI 02906; 401-421-9550], showed DynaText, a presentation system that begins to demonstrate why we might want to have information in SGML. DynaText takes SGML data and allows users to read, query, and annotate the resulting electronic books over a network or on a standalone PC or Macintosh (including, impressively, a laptop running X windows). DynaText builds a full text index, a dynamic table of contents, and hyperlinks for tables, figures, footnotes, cross-references etc. Because it uses the structure of the document and configurable stop lists in its searches, DynaText provides for rapid searching and dynamic filtering of data based on SGML entity attributes. It also supports multiple stylesheets, public and private annotation, bookmarks and session history logs. EBT designed DynaText with emerging standards such as HyTime, DSSSL, and the Text Encoding Initiative tag set in mind, so that it will be consistent with these when they are approved.

EXOTERICA CORPORATION [383 Parkdale Ave., Suite 406, Ottawa K1Y 4R4, CANADA; 613-722-1700; fax

613-722-5706] showed its XGML OmniMark scripting language and validating SGML parser which runs on 386, Macintosh, Sun Sparc, HP and DEC machines under a variety of operating and windowing systems. Its strengths lie in document translation and in its scripting capabilities.

INTERLEAF INC. [Prospect Place, 9 Hillside Ave., Waltham, MA 02154; 617-290-0710] showed its SGML authoring and tagging tools, its Relational Document Manager environment built on Oracle and specialized versions of it for the aircraft industry (the Interleaf ATA Document Management Solution) and the military community.

OWL INTERNATIONAL INC. [2800 156th Ave. SE, Bellevue WA 98007; 206-747-3203; fax 206-641-9367] showed how its Guide Writer and Guide Readers SGML products could be combined with Avalanche Inc.'s FastTAG in an integrated SGML environment they call GUIDE Professional Publisher for MS-DOS machines.

SOFTQUAD [56 Aberfoyle Crescent, Suite 810, Toronto M8X 2W4, CANADA; 416-239-4801; fax 416-239-7105] demonstrated the latest release (2.1) of its Author/Editor product, an SGML environment for Mac's, MS-DOS, DEC Station, Wand SCO UNIX, Sun, and IBM RS6000 platforms, which includes new table handling capabilities as well as the rule (DTD) builder, parser, and word-processor facilities associated with previous releases.

US LYNX [835 Broadway, New York, NY 10003; 212-673-3210] and Data Development Inc., [3595 Corporate Parkway, Palm City FL 34990-8154, 407-288-7226] had booths at which they advertised their data conversion services.

## CALS SOURCES

Specialized newsletters with CALS related information:

**Advanced Office Technologies Report** (ISSN 1054-1462) bi-weekly \$393 US; \$441 outside US. DataTrends Publications Inc., 8130 Boone Blvd., Suite 210, Vienna, VA 22182-2608 (800) 766-8130

**Barlow Report**, AGFA Caps, 200 Ballardsvale St., Wilmington MA 01887, (508) 658-5600 Free

**CALS Report** (ISSN 0897-991x), Knowledge Base International, 13939 Northwest Freeway, Suite 270, Houston TX 77040 (713)-690-7644 monthly \$250-\$350

**Datalab Newsletter**, (ISSN 086-4438) quarterly; Data Conversion Laboratory, 184-13 Horace Harding Expressway, Fresh Meadows, NY 11365 \$12. annually

**Document Management** (ISSN 1057-0365), Pinnacle Peak Publishing Ltd., 8711 E. Pinnacle Peak Rd. #249, Scottsdale AZ 85255 (free to "qualified professionals")

**EPSIG News** (ISSN 1042-3737), OCLC Inc., 6565 Frantz Road, Dublin, OH 43017

**Product Data International** (ISSN 1050-7043), Warthen Communications, N5303 Broughton Rd., Albany WI 53502 (608) 862-1702 \$265 US & Canada



## THE MUSEUM COMPUTER NETWORK

The 1991 annual meeting of the MCN attracted over 200 participants to sunny Santa Monica. By the time it began on November 7, I had been at two days of CIMI meetings (see Standards section for a report on CIMI) and taught a full day workshop on interactive multimedia and was already tired so maybe it wasn't fair that I thought the opening plenary session which featured 10 minute reports on the Art Information Task Force, Getty AHIP, Conservation Information Network and American Institute for Conservation, CIMI, CIDOC, AASLH Common Agenda, and Willoughby Project Catalyst was too little about too much. I think people know what these projects are by now, and that if they are to be on programs, we should conduct more in depth discussions of their goals, approaches and results. In the future maybe such updates could take place via poster sessions or open houses.

Fortunately, the second plenary provided an in-depth examination of emerging issues on the national networking scene by Richard West, Assoc. V.P. for Information Systems and Administrative Services, University of California System. West discussed the strengths and weaknesses of the concept of a National Research and Education Network (NREN) which assumes the Internet approach of tiered networks, with local LAN's connected to mid-level WAN's which are in turn linked to a backbone network supporting peer-to-peer communication between users. As the existing Internet system is upgraded from T1 to T3 speeds, West asked whether the three tiered approach can be made reliable, how NREN should be funded, who should have access, and, not the least, how such critical policy questions should be answered. Noting the history of the network, which was designed to permit machine-to-machine connections but is now used 80% for access to people and to information resources, West acknowledged the hazards of trying to predict how NREN might be used but noted that it would certainly require better information management since presently remote access was like "trying to drink water from a fire hose". He discussed a number of standards and some approaches to policy, including intellectual property right policies, before introducing the Coalition for Networked Information, a group formed in March 1990 by CAUSE, EDUCOM and the Association of Research Libraries. West hoped that the many CNI working groups whose work he reported would serve as forums to debate the outstanding policy issues.

In the afternoon, the concurrent sessions began. I attended Financial Accounting Standards and Museum Information Systems which to my mind revealed the dangers of two heavily armed professions blundering around in the dark, each refusing to recognize the other. Thomas Jones, a CPA with Ernst & Young who had attended many of the FASB meetings described the FASB position and how it was arrived at. He noted that the abstract logic of earlier rulings drove the FASB to its position that collections are assets. He admitted that the reaction by the museum community far exceeded what FASB had expected or was

prepared for and noted that even without the likely revision process, implementation of the guidelines had been postponed from 1992 to 1995. Steve LeBlanc from Questor Systems argued that while he did not support the recommendations of FASB, a well designed collections management system should support the information requirements of such a policy. Unfortunately, he did not attempt to elucidate just what those requirements were or how 'well designed' software would satisfy them. Mary Case, Registrar of the Smithsonian, presented arguments advanced by the AAM which argued in effect that including the value of collections on the balance sheet of a museum distorted rather than clarified its financial status to those concerned with providing it with loans or assessing its creditworthiness. She also argued that it was impossible in some cases and wasteful in most others to require museums to place a value on holdings. While the first argument should be germane to FASB, it obviously isn't the reason museum professionals are so upset since they don't really care if accountants do silly things. The second argument comes closer to expressing a museum concern, but would hardly be such an emotional matter if that was all it involved. Rather the crux of the dispute comes down to a culture clash between accountants who place a monetary value on everything, and museum professionals who derive a substantial part of their satisfaction from the concept that the work they do, and the collections they "hold in trust" are priceless. The heated audience discussion confirmed that accountability and access were not at issue, but that the FASB had hit a very tender spot. Apparently, no rational discussion of the possible information systems implications of the FASB rulings can be conducted at the present time. Maybe we can try again once there is a final ruling?

Following the FASB session, I chaired a session in which vendors of membership, development and participation systems compared how their software handled five user requirements for such systems which present interesting design challenges. Representatives from Access International, Master Software, and Questor Systems addressed how their systems dealt with a specific case of multiple names and addresses, pledges and pledge payments, participation by members in museum activities, relationships between individual clients and organizational clients, and the compilation and matching of prospect lists from outside data sources. Their prepared responses were provided to the audience in handouts and the representatives explained the screens a user would see and how they would command the system to produce an acceptable result. I found this very revealing of the quality of thought that went into the design of each system and of the attention each paid to its user interface.

That evening the participants were invited to a reception at the Voyager Company, a publisher and distributor of electronic multimedia located on the beach near the conference hotel. There they saw dozens of workstations set up with recent videodiscs and CD's and were invited to interact with them and discuss them with their designers.

On Friday, following the meeting of the Special Interest Group on Visual Information, I attended sessions on designing information systems accessible to special populations. With the passage of the Americans with Disabilities Act, museums have become more aware of the special needs of many potential visitors. Christine Steiner, of the General Counsel's office at the Smithsonian, opened two sessions on this topic with an introduction to the requirements of the ADA and of section 504 of the Rehabilitation Act of 1973 which clearly list "places of public display" as responsible for making physical changes to accommodate handicapped people if such alterations are practical to make and can be effective. She urged that museums involve the community in an advisory role in the conduct of an accessibility study to identify areas in which they might make changes. Alice Rose of the California High Tech Center who trains teachers of the disabled throughout the state, addressed the needs of the "learning disabled" who are the largest category of handicapped people but the most invisible once they are out of school. She demonstrated a variety of design strategies in labeling ranging from avoiding visual clutter by simply using sans serif fonts, ragged right edges and double spaced text, to providing human "guides" through interactive exhibits whose point of view serves as non-threatening help and as a navigation aid to people who are otherwise overwhelmed by the choices presented in such software. In a subsequent session on Saturday morning, Ellen Cutter of Santa Monica College demonstrated specific software products designed to help the hearing impaired, people with low vision, and those with a variety of physical and learning disabilities. Some of these products are available free from hardware vendors or are included as part of the operating systems, and some others were low cost assistive technologies. Both Apple (408-996-1010) and IBM (800-426-2133) have technology resource offices for assistive technology products which can give detailed guidance and referrals. I was particularly struck by the problems encountered in developing screen reading programs in GUI environments and by the power of low cost word prediction software to speed typing for those for whom keyboard input is painfully slow.

In the final session that I attended, conservators and information specialists showed off extremely high tech solutions to a variety of conservation problems. While the underlying conservation problems were largely beyond my competence, the discussion of solutions using MRI and advanced imaging technologies demonstrated that MCN audiences are now ready to critically review very advanced approaches.

Overall it was another growth year for MCN. The number of sessions devoted to topics other than collections management at least equaled those on objects. At least four sessions dealt with the impact of new laws or regulations on information processing for museums. There was a notable increase in technical sophistication in the audience. I hope the joint meeting with the American Society for Information Science (ASIS) in Pittsburgh in 1992 furthers the trend.

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## CALENDAR

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**January 14-16** New York City Electronic Networking & Publishing '92. Contact Meckler, 11 Ferry Lane West, Westport CT 06880; 800-635-5537.

**January 31** Harrisburg PA Museums and the Law: Advocacy, a one day workshop. Contact: Penn.Federation of Museums and Historical Organizations, P.O.Box 1026, Harrisburg, PA 17108-1026; 717-787-3253

**February 8-11** Chicago Art Libraries Association 20th Annual Conference. Contact ARLIS/NA, 3900 East Timrod St., Tucson AZ 85711

**February 12-15** Chicago Visual Resources Association 10th Annual Conference, Contact. Rebecca Hoort, Dept. of History of Art, 20B Tappan Hall, 519 S. State St., University of Michigan, Ann Arbor MI 48109-1357.

**February 18-19** Crystal City VA AFCEA Conference on CR-ROM Interoperability. Contact: AFCEA Intelligence Dept., 4400 Fair Lakes Court, Fairfax, VA 22033; 703-631-6250; fax 703-631-4693

**February 24-28** Fort Lauderdale TechDoc Winter '92. Contact: Graphics Communication Association, 100 Daingerfield Rd., Alexandria VA 22314-2888; 703-519-8162

**February 26-28** Orlando Multimedia '92 the 10th Annual Interactive Instruction Delivery and 7th Annual Learning Technology in Health Care Sciences conferences. Contact Communicative Technology Corp., 50 Culpepper St., Warrenton VA 22186; 703-347-0055

**March 11-15** Dallas, TX Third National Court Technology Conference, Contact Thomas Dibble, National Center for State Courts, 300 Newport Ave., Williamsburg, VA 23187; 804-253-2000.

**April 13-16** Crystal City VA CALS and EDJ Conference and Exposition. Contact Martha Woods, USPDI Exposition, 301-445-4400.

**April 21-24** Washington DC Joint meetings of the CIMI Committee and Documentation Committee of ICOM. For further information Contact John Perkins @ 902-454-4077

**April 25-29** Baltimore MD, American Association of Museums Annual Meeting, Contact AAM, 1225 Eye St. NW, Suite 200, Washington DC 20005; 202-289-9122

**April 26 - May 1** Indianapolis Museum Store Association, Contact: MSA, 501 S. Cherry St., Suite 460, Denver CO 80222; 303-329-6968



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## IN-BOX

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### ONLINE SERVICES: A REVIEW of the WELL

I've never mentioned the WELL (Whole Earth 'Lectronic Link) in this Newsletter, and I thought it might be time to introduce it. The WELL is an electronic communications network physically based in Sausalito California with about 5,000 subscribers worldwide. The WELL supports about one hundred public conferences, numerous private conferences and collective work-spaces, electronic mail between members and out to other networks, and on-line interactive dialogues. Private conferencing facilities are available for any business, organization or group that wishes to establish one.

The WELL has a moderately counter-culture tone to it which can be attributed to its origins or to the California culture. A large number of its conferences, which are a kind of electronic forum which subscribers may browse and contribute to, are devoted to self-realization, sexual orientation and the Grateful Dead. About twenty deal with computers - either specific makes, languages or professions. Whatever your interests, you are likely to find a virtual gathering of fellow travelers here.

### The WELL itself

The WELL is accessible from your modem at 1200 or 2400 baud for \$10 per month plus \$2 per hour (your first five hours are free). Most U.S. users reach the WELL through the CompuServe Packet Net which provides low cost daytime connections (\$4.50 per hour) from local phone calls in most U.S. cities but any other carrier will do. If on CPN, the user types `well` in response to the Host Name prompt and is in. New users register as "newuser" and previous users sign on at this juncture. New users may pay by VISA (or send a check) and will receive (by mail) a coherent and complete ring bound user's manual within a few days of signing on.

You arrive in the WELL in the Entry Conference which is like any other conference (convenient in that it reinforces the command interface). From here the user can elect to see the available conferences, find out who else is on-line, get general information and help, execute file transfers or conduct electronic mail.

There are, no doubt, as many ways to relate to an electronic information network as there are people. My style is purely operational - I look for information I want, and if it is there, or can be acquired by writing electronic notes to people who are on the network, then I use it. I don't much like electronic networks per se and I don't get on them to converse with others who are logged on at the same time (one of the WELL's features, but not one I'll ever explore).

Mail functions are the usual - list, read, reply, send, store, delete - and mail works in the usual way. Users can

type in their messages and use a primitive text editor to correct them, or upload files written in their own systems and output as ASCII files.

The conferences are the heart of the system. Exploration begins by requesting a list of conferences, which is conveniently organized into seven categories of Business/Education; Social/Political/Humanities; Arts/Recreation/Entertainment; Grateful Dead; Computers; Technical/Communications; and the WELL Itself. A user may, of course, explore all the conferences, but this review will limit itself to two which I feel might be germane to readers of Archives and Museum Informatics: the Electronic Frontier Foundation Conference (eff) and Art Com (agen).

## The Electronic Frontier Foundation Conference

Selecting the Electronic Frontier Foundation conference (g eff) reveals a menu of five choices: 1. EFFector online (the electronic fortnightly newsletter of the EFF) 2. Topic archive - from the WELL's EFF conference and related items 3. Documents - EFF Statements, articles of interest, etc. 4. Legal - Briefs, complaints, lawsuits, opinions 5. EFF "media review" - press coverage of EFF

If EFFector online was the only thing on the WELL, your subscription would be worth it. Recent issues have contained the text of Mitch Kapor's testimony before the House Sub-committee on Telecommunications and Finance, exposure of the privacy violations in MCI's Friends and Families discount program (rectified as a result) and discussion of the philosophical differences between the NREN proponents and the EFF which advocates a publicly available ISDN network.

The Topic archive includes huge files of text from the Craig Neidorf trial, and bulletin board talk on Prodigy and free speech, Search and Seizure, Lotus and other first amendment controversies. An exchange on "fair use" of computer software which took place between July 15 and August 7 1990 was fairly typical of electronic bulletin board interchanges. It involved 32 messages. A few were short informative notes and citations from people who had information and were pointing an otherwise meandering cocktail party conversation towards facts.

The EFF Documents library was more promising. In addition to mission statements and history of the EFF, the U.S. Constitution in ASCII, and miscellaneous news articles, it contained an in depth interview on computer crime with Dorothy Denning (Feb. 91, 50K), Laurence Tribe's "The Constitution in Cyberspace (March 91, 48K), and an early draft of a very useful White Paper on "Formulating Company policies for access to, use and disclosure of electronic mail on company computer systems" now sold by the Electronic Mail Association for \$45.

The Legal archive contained an interesting discussion of the EFF and the bill of rights as well as the amicus brief they filed in U.S. v. Riggs. All in all, well worth visiting.

The WELL encourages users to give a "fixseen" command so the system will recall what they have seen in the past and show them only new material the next time they log on. It also provides useful screening commands (forget) so that the topics you would just as soon forget about can be masked from your menu until you decide to expose them again. Using these tools, I tailored EFF for my next visit, and then went off to see the Art Com Electronic Network (g acen). EFF is programmed to give you a final word of advice "You are now leaving the EFF conference, but you are still on the electronic frontier! Be careful out there.."

## The Art Com Conference

The welcoming menu of Art Com provides access to current and back issues of Art Com Magazine and Fine Arts Forum, as well as access to the electronic art gallery, graphic art gallery, Art Com Electronic shopping mall, and the Art Spaces databases. There are also 660 topics on the bulletin boards, many still under active discussion. There are lots of discussions of virtual reality, DVI, censorship, and virtual exhibit spaces so I logged into the "Anna Couey Virtual Museum of Descriptions of Art" hosted by "Patrons of the Arts M. and Peter Normal". Except for a description of one performance, posted the second day of the topic, this museum was virtually empty.

Art Com Magazine (a monthly, December 1991 is issue 54) is 4-8 pages of text by a guest editor. #55 by Fred Truck, includes his reflections on the bioapparatus seminar at Banff (see in-box for the Proceedings). #54 by Chuck Welch is mostly devoted to a discussion of his "Rellux Network" project. #53 by Coco Gordon is what used to be called concrete poetry, using ANSI graphics for page layout and line drawings. And so it goes; a mixed bag in intent and quality. Currently Art Com is looking for a new Executive Editor, probably reflecting Carl Loeffler's appointment at the STUDIO for Creative Inquiry at CMU.

Art Spaces is a useful database of artist run organizations with exhibit/performance spaces, currently limited to northern California and Canada. It has an alphabetical and a subject listing, with one paragraph descriptions and contact addresses and phone numbers.

Datanet Books turns out not to have John Cage's work (the only thing on the menu) because it has been moved to ArtWorks where it resides with nine other works. I selected "Digital Mundra: The Philosopher. An Interactive Artwork by Sonya Rapoport by its name. It was a mistake. It was a trivial two step game in which I selected words from a list and it returned a profound eastern saying (by Rabindranath Tagore).

Fine Arts Forum and the F.A.S.T. Bulletin board were more interesting. Back issues of the Fine Arts Forum included useful software reviews, conference announcements and book reviews. The publication alternates with Leonardo Electronic News as of Decem-

ber 15 1991, with Fine Arts Forum published on the first of the month, and LEN on the 15th. Volume 1 #1 of LEN continues with reviews, announcements and the like, but promises more substantial matters to come. This may be worth asking for: to subscribe mail to fast@gar-net.berkeley.edu with the message SUB LEN, your name, email address and postal address.

Overall, my visit to the WELL cost \$8.40 (not counting the free time discounts) and I downloaded about 100 pages of material I would probably not have had access to otherwise. Not a bad day.

David Bearman

## PUBLICATIONS

### REPORTS

**Archival Administration in the Electronic Information Age: An Advanced Institute for Government Archivists.** Edited by Richard Cox (Pittsburgh, SLIS, December 1991) 74p.; free from Richard Cox, University of Pittsburgh, LIS Bldg. Pittsburgh PA 15260

This is a report on the second advanced institute for government archivists on electronic records, organized and conducted by the School of Library and Information Science, University of Pittsburgh and co-sponsored by the National Association of Government Archives and Records Administrators, June 2-14, 1991. In it Richard Cox summarizes each presentation and discussion of the two week period and provides relevant background information. The result is a quite complete record of the institute and its achievements. □

**IMOSA: Overview Document, Rev Version November 1991, 9p.**

**The IMOSA Project, Phase 1 Report, 1991, 63pp.**

**IMOSA Project, Functional Requirements Corporate Information Management Application (CIMA),** by Dale Ethier Consulting Inc., November 5, 1991, 114pp.

**Guidelines for Managing Electronic Information in User Directories, December 1991, 22pp.**

**Quick Reference Guide to Office Systems Standards, Draft, December 10, 1991, 26pp.**

These latest reports of the Information Management and Office Systems Advancement (IMOSA) project, a joint initiative of National Archives of Canada, Government Records Branch and the Department of Communications, Canadian Workplace Automation Research Centre, provide the first full, public, reports on this important electronic records management experiment. IMOSA has just completed Phase 2 (whose report we can look forward to shortly). Phase 3, involving partners from public and private sector, got underway on December 2, 1991. □

## BOOKS AND ARTICLES

**Bioapparatus: Virtual Seminar on the Bioapparatus** (Banff, Banff Centre for the Arts, 1991) 120 pp.

Bioapparatus is the proceedings of a two day seminar held at the Banff Centre for the Arts, October 28-29, 1991 as part of a ten week residency on the bioapparatus, a term coined to capture the concept of the mind and the tools constructed by man as extensions of the body and to reflect on the implications of virtual reality for the bioapparatus. It consists of twenty one page statements by artists, computer scientists and humanistic political activists invited to the seminar and the discussions they invoked. The papers and discussions are intriguing, but I felt that most participants were making virtual reality seem rather more of a revolution than it is. The Banff Centre is seeking proposals (due January 31) from artists interested in realizing virtual reality projects [Douglas MacLoed, Project Director, Art and Virtual Environments, the Banff Centre for the Arts, Banff T0L 0C0 CANADA; 403-762-6410]. □

**Betty Davidson, Candace Lee Heald and George E. Hein, "Increased Exhibit Accessibility through Multisensory Interaction", Curator, v.34(4) 1991, p.273-290**

This is an exceptionally important empirical study of the effect making changes in the accessibility of exhibits can have on museum visitors. With pretests, results from interim changes and final results based on the ultimate reconfiguration, the study demonstrate how interaction, sound labels, smells and adjustments to physical accessibility can transform the museum experience for handicapped and able bodied visitors - in this case more than doubling the average time spent in a gallery and vastly expanding the means of experiencing the message. □

**Electronic Books - Multimedia Reference Works: Proceedings of the Bergen Conference 21-23 November, 1990** (Bergen Norway, Norwegian Computing Centre for the Humanities, 1991)

The three day Bergen conference on multimedia books sounds, from Espen Aarseth's account in this volume, to have been intellectually and personally worthwhile. For those of us who were not among the 175 attendees, this volume in English or Norwegian with English summaries, provides a taste beginning with Graham Brown-Martin's stirring announcement of the end of the paper era and ending with Eli Mylonas' description of the Perseus Project, a modest beginning to the end. Unfortunately the summaries in English leave more tantalizing hints of what was said than solid ideas so those of us without Swedish are a bit lost. I arrived at two conclusions from them: that the conference converged on a definition of interactive multimedia as "multi-sequential" rather than as "non-sequential" and that the Scandinavian participants concluded

that the time was not yet ripe for electronic books in countries as small and linguistically isolated as theirs.

Several of the English papers deserve broader readership. The paper by George Landow and Gary Weissman on emblem books in *Intermedia* at Brown University and by Eli Mylonas on Project Perseus are valuable English language contributions to the literature on applications of interactive multimedia. Patrizia Ghislandi provides a useful, if time bound, comparison of the advantages and disadvantages of the various optical delivery formats. Peter Looms recounts the trials of acquiring rights for a multimedia product on Greenland and makes universally valid observations on the problems of intellectual property and multimedia as well as suggesting possible solutions. This account is less complete than the one he published in the ICHIM Conference Proceedings, but makes a few different points.

Ian Hunter, "The Gateshead hypertour tourist information system: an application of hyperCard" *Library Association Record*, April 1991 p.207-210

This general information system, installed in a shopping mall, demonstrates how museums and other cultural institutions can make themselves and their holdings better known by using information dissemination opportunities provided by others - in this case the tourist board.

Jeff Kennedy, **User Friendly: Hands-on Exhibits that Work** (Washington DC, Association of Science-Technology Centers, 1990) 77p. spiral bound; \$35.00 (\$25 to members)

This terrific resource book is a must for anyone involved in exhibit design. Its text, which is direct and contains explicit guidance, is well illustrated by photographs and replete with valuable human factors reference data. Although it is oriented primarily towards installations, I found it directly applicable to interactive software design for museum exhibitions.

Judi Moline, Allen L. Hankinson and Lawrence A. Welsch, **Multimedia Courseware in an Open Systems Environment: A Federal Strategy**, NISTIR 4484 (Gaithersburg MD, U.S. Department of Commerce NIST/NCSL, December 1990) 60p.

This paper is simultaneously a tutorial on the concept of an Open Systems Environment and a strategic framework for future multimedia technology migration. It is also one of the clearest statements of the benefits of open systems and the best means of planning for them that I have ever read. This book also serves as a useful framework in which to understand Moline's work on standards for museological systems.

Joe Moreau, "Directory of Computerized Inventory Control Systems", *American Bookseller*, November 1991, p.29-44

This is the 1991 update of a listing of computerized bookselling systems which are often used in archives and museum shops both for books and for other inventory. As in previous editions, the directory describes major features of each system using standardized terms and configuration, training, support and other information.

**Museums & Information: Proceedings** (Manitoba Museum of Man and Nature and the Canadian Heritage Information Network, no date - 1991) 212p.

These proceedings of the CHIN conference held in Winnipeg May 1990, are transcripts of papers given at that meeting. They are largely in English, with summaries in English and French. The limitations of the volume are that these are not papers written for separate publication, but oral presentations, sometimes with copies of accompanying overheads. For a review of the meeting, see this journal, vol.4#2.

Steven R. Newcomb, Neill A. Kipp and Victoria T. Newcomb, "The 'HyTime' Hypermedia/Time-based Document Structuring Language", *Communications of the ACM*, November 1991, vol.34(11) p.67-83

This extensive introductory discussion is, without doubt, the best thing in print on the subject. It also serves as a useful; introduction to SGML and the status of Standard Music Description Language.

Catherine Plaisant, "Guide to Opportunities in Volunteer Archaeology: Case study of the use of a hypertext system in a museum exhibit", *Computer Science Technical Report Series*, University of Maryland (College Park, MD 20742)

This brief report on an application of Hyperties and touch screens to a single workstation information system shows what can be done easily, but doesn't evaluate its effectiveness.

Deirdre Stam, "What ABOUT the Mona Lisa?: Making Bibliographic Databases More Useful to Art Historians by Classifying Documents According to the Aspect of Art Object(s) under Consideration", *Art Documentation*, v.10(3) Fall 1991, p.127-130

Stam advances a radical proposal for cataloging and indexing the literature of art, by classifying documents according to one of five the "aspects" (a combination of life cycle, genre and provenance) which she believes will result in better retrieval. Provocative, but too short on examples to be convincing yet.

Amherst H Wilder Foundation, **Marketing Workbook for Nonprofit Organizations** (132p.) and **Strategic Planning Workbook for Nonprofit Organizations** (72p.). Single copies \$25 + \$1 postage; A.H.Wilder Foundation/MSS, 919 Lafond Ave., St.Paul MN 55104

These two workbooks provide step by step instructions for developing a marketing plan and a strategic plan for an organization using a small number of well thought out and nicely designed information collection forms. Each workbook explains the steps in the process using a hypothetical case to illustrate the way in which the information collected on the forms is gathered and used. The workbooks are clearly written, nicely designed, and thorough. Each contains a short, but quite adequate, bibliography whose function is practical rather than academic. The marketing workbook is especially valuable for the detailed checklists it provides. I would recommend these both to almost any organization - I haven't yet seen an archives or museum that doesn't need to make or revisit its strategic and marketing plans.

#### SPECIAL ISSUES

**Bulletin of the American Society for Information Science**, vol.18(2), December 91/January 92 Special issue on "Art Information", edited by Joseph A. Busch

The four articles and project directory in volume provide a valuable overview of the state of art information today. The listing (compiled by Pat Barnett) describes 44 international "art information endeavors"; the articles focus on four of these which are contributing to standards (CIMI, by David Bearman), networks (CHIN, by Ian Sutherland), resources (Getty-AHIP, by James Bower) and applications (the Witt Index, by Catherine Gordon).

**Museum News**, November/December 1991, v.70(6)

Features museum archives with articles by Alan Bain; Kathleen Hart; George Davis; Katherine Kane; Adrienne Cooper and Mei-Lin Liu; and Christaud M. Geary, A.N.Keiser and Joan Stahl; emphasizing the link between archives and objects and the contribution each makes to the other. While you're at it, read Alan Newman's "Present at the Revolution" in the Jan/Feb issue.

**The Public Historian**, vol.13(3) Summer 1991 Special Issue on Preservation Technology

This entire issue is must reading for anyone involved in cultural history or anthropology research and for museum and archives professionals. The multi-disciplinary perspective allows articles on paper preservation to sit comfortably beside those on site stabilization. I found Betsy Chriddenden's "When Cultures Collide: Computer Technology and the Cultural Resources Professional", a particularly thoughtful and wideranging piece and felt that John Knoerl's "Mapping History Using Geographic Information Systems" was a better introduction to this difficult subject than I've read elsewhere.

**Registrar**, vol8 #2, Fall 1991,

The issue is devoted to loan practices, and includes a Statement of Practice for Borrowing and Lending (September 1991) intended to serve as a standard framework for museum policies, reports of the loan committee survey, and a discussion of the legal problems posed by abandoned loans along with citations to applicable state laws. Useful for reference.

#### NEWSLETTERS/JOURNALS:

**Arts Wire News** (New York Foundation for the Arts, 5 Beekman St., #600, NY, NY 10038) started publishing this summer. An on-line edition is due out soon. Vol.1 #3 reported on a variety of on-line services for the arts including "Art Hazards News" run by the Center for Safety in the Arts; ARTLINK(tm) which includes lists of exhibits, artists, models and galleries and information on censorship, stolen art and health hazards is available free for browsing or at \$50 for posting at 404-377-2115; and the Art Com Electronic Network (ACEN) on the WELL (see review elsewhere in this issue).

**The British Library Research and Development Department Research Bulletin** (ISSN 0952-2832) free, from Publications, The British Library R&D Department, 2 Sheraton St., London W1V 4BH I was surprised to discover I've never mentioned this valuable report on funded research in the UK which both announces recent grants, reports on published results, and reports on research opportunities in Great Britain.

**Electronic Public Information Newsletter** (ISSN 1057-834X) James McDonough & Vigdor Schreiberman co-editors and publishers, P.O.Box 21001, Washington DC 20009; 703-237-9501, fax 703-237-7923 bi-weekly, \$249 for 24 issues (\$130 for libraries and public interest groups)

Based on vol 1 #3 (Nov.22, 1991) this newsletter covers national political and regulatory developments in the area of access to electronic information. The issue in hand discusses George Brown's bill to provide Landsat data to universities, John Glenn's sunshine act amendments, NREN, the SEC Edgar system, OMB's OIRA director and the court ordered disclosure by NIST of the identity of all U.S. government "sensitive information" systems.

**Items** (Social Science Research Council, 605 Third Ave., New York NY 10158), vol.45#2-3 June-September 1991 contains a report by Tom Lodge on "Museums and Archives in Africa" which documents the depressing state of these institutions and the compelling need for them to clearly identify their constituency, reorganize their collections to reflect the societies they document, and enhance their resources.

Archives Library Information Center (National Archives and Records Administration, Washington DC 20408; 202-501-5415) has released ALIC Bibliography #6 "Understanding Users & Use" by Paul Conway; ALIC Acquisitions List Covering the Period October 1, 1990 - September 30, 1991 (issues 13-14 with indexes by author/sponsor, title and subject); and a new edition of ALIC Bibliography #3, "Research papers prepared by members of the Archivist Career Training Program"; all dated October 1991. The Conway bibliography is a valuable addition to the literature. The acquisitions lists are useful for those who use ALIC as a source of ILL's, and have improved dramatically in their comprehensiveness over previous years, but they are still not complete enough to be used as a current awareness service which would be a nice goal.

**Insights: Museums, Visitors, Attitudes and Expectations: A Focus Group Experience.** Book and videotape free (\$5 handling) from the J.Paul Getty Trust Book Distribution Center, GCEA-3, P.O.Box 2112, Santa Monica, CA 90406; phone 213-453-5352.

#### National Library of Medicine: Programs and Services Fiscal Year 1990

Reports on the Unified Medical Language System, the "Visual Human" imaging project, electronic document delivery, the Computer-based Curriculum and a host of other innovative information technology undertakings. Not many Federal agencies have annual reports as interesting. The staff bibliography is particularly useful.

**Photographic Preservation and the Research Library,** Jennifer Porro ed. (Mountain View CA, Research Libraries Group Inc., 1991) 56pp. free

These papers from a workshop held in October 1990 present a combination of technical advice and policy guidance, and present the conclusions of discussions by the forty attendees. Well worth reading.

**Planning for Museum Automation: A Teaching Resource Guide** by John Perkins is now in its final form. The workbook was tested at workshops given by Perkins and Margareta Sanders at recent AASLH and MCN meetings. The MCN Board at their meeting in November decided to issue an RFP to anyone interested in publishing the volume which is intended to be used both by instructors and participant in museum automation training courses and workshops. It is hoped the volume will be available by the fall of 1992. The workbook consists of overheads, exercises and in-class discussion questions intended to be used in one to three day workshops and in academic courses.

## SURVEY OF COMPUTING IN ART MUSEUMS

James B. Pick [Director of Information Management Program, University of Redlands, 12090 East Colton Ave., P.O.Box 3080, Redlands CA 92373-0999] is again conducting a survey of art museums use of computers as part of his on-going surveys of the use of computing in arts organizations. The 1991 survey forms have been mailed and will be analyzed early in 1992. If you need a form, or the results, contact Dr. Pick directly. For a report on the results of the previous survey, see articles by Pick in Archives and Museum Informatics vol.4 #1 (p.2-7) and #2 (p.2-7).

## INTERACTIVE MULTIMEDIA IN MUSEUMS: A TELECONFERENCE

The George Washington University is sponsoring a three hour teleconference on January 28 from 1pm.-4pm. Eastern time, on interactive multimedia in museums. Topics will include production techniques, application to conform with the Americans with Disabilities Act, and innovative presentation methods. To receive the teleconference, contact: Arlene Polinsky or Peter Neal, Multimedia Development Program, George Washington University, 202-994-8233.

## LARGE SCALE HYPERMEDIA RESEARCH

The Carnegie Mellon University Information Technology Center, a collaboration with IBM, is circulating a description of "The Alexandria Project", intended "to enable interactive, personalized, long-term management, access and sharing of large amounts of information in an integrated and extensible fashion". The project is designed to explore methods for users to exploit the terabytes of multimedia information that will soon be available over networks. [Contact Michael Horowitz, ITC, Carnegie Mellon University, Pittsburgh PA 15213; mh11 + @andrew.cmu.edu]

## HELP WANTED: NATIONAL NETWORKING

The Coalition for Networked Information [1527 New Hampshire Ave., NW, Washington DC 20036; 202-462-7849] is circulating three "Calls for Statement of Interest and Experience". Individuals and institutions are asked to respond. 1) The Rights for Electronic Access to and Delivery of Information (READI Program) is a proposed framework for licensing electronic rights. The prospectus describes a voluntary relationship between subscribers and rights holders based on agreements between a Rights

Brokering Organization (RBO) and a Rights Holding Organization (RHO) and calls for the drafting of two specific documents defining these relationships. The Coalition is seeking input from interested parties to define these terms. 2) TopNode is an electronic directory to the network. The Coalition is seeking institutions and/or individuals that could edit/host the "TopNode" for the network which would serve as a directory of directories, catalogs, resource lists and services. 3) An unnamed project involving "development of a packet of information for use in formulating and addressing institutional and organizational issues arising from the emergence of a national networked information infrastructure and environment." □

## ARCHIVES AND MUSEUMS SOFTWARE DIRECTORY

Questionnaires have been distributed to over 200 vendors as part of the data collection for the third edition of the Directory of Software for Archives and Museums to be published in April 1992. As with previous years, numerous forms have been returned by the post office as unforwardable. Any vendor who has not received forms should request them from Archives & Museum Informatics, 5501 Walnut St., Suite 203, Pittsburgh PA 15232-2311; 412-683-9775.

When published, the Directory will be priced at \$50; pre-publication orders will receive a 10% discount. Billed orders add \$5 in U.S., \$10 outside of U.S. □

## HyTime INTEREST GROUP

The SGML Users' Group Special Interest Group on Hypertext and Multimedia (SGML SIGHYPER) is devoted to the promulgation of information about of the ISO/IEC "HyTime" Hypermedia/Time-based Structuring Language (ISO/IEC Draft International Standard 10744). SGML SIGhyper was created to provide a way for those who want a flexible and open technical framework for hypermedia publishing to contribute to the process of creating that framework. Membership in SGML SIGhyper will connect you as directly as possible with the ISO process, so that your requirements for integrated open hypermedia can be known publicly and met in the course of a public process, and so that you will be informed about pertinent developments regarding technologies relevant to the creation, maintenance, and processing of hypermedia documents represented in SGML. SGML SIGhyper's parent organization is the international SGML Users' Group, which is privileged to send limited delegations to ISO meetings where SGML-based standards such as HyTime are developed. Members of SGML SIGhyper receive the "SGML SIGhyper Newsletter," the "SGML SIGhyper Directory," which keeps them abreast of current technical information about the emerging applications of HyTime and other developments and are represented at ISO HyTime meetings. (contact for SGML Users' Group, Stephen G. Downie, Secretary, c/o Softquad Inc., 56 Aberfoyle Cres., Suite 810, Toronto, Ontario, CANADA M8X 2W4 (voice: +1 416 239 4801; fax: +1 416 239 7105).

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## SOFTWARE REVIEWS

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### MacTRAC Fund Raising Software 2.0

MacTRAC 2.0 [The Technology Resource Assistance Center Inc., 530 Oak Grove Ave, Suite 101, Menlo Park CA 94025; 4125-853-1100] \$895. Demo packet \$20 limited to 50 records. Note that this is a single user system only.

MacTRAC advertisements stress its flexibility, support and affordability, and the price is, indeed, unbeatable. The documentation is complete and readable. I did not speak to customers, but the support terms offered seem reasonable. Flexibility is, of course, relative. MacTRAC will permit recording of two addresses and names for any individual or corporate client whether donor, prospect, or volunteer. It permits recording of an "action" and a "ticker" date and of an unlimited number of gift, pledge, dues and payment transactions, and it provides for printing both pre-defined and ad hoc reports. But the degree of this flexibility is severely limited, and some less desirable characteristics of MacTRAC need to be considered.

MacTRAC is built around a master file of Donor records (although the "donors" need not have donated to be included). Each donor record consists of two screens of fixed length identification data and one, 150 character, searchable free text field comment. Each donor record is related to an unlimited number of transaction records and one unlimited length, but non-searchable, "notepad". The fields in MacTRAC records are all defined by the package; users may set values for seven "coded" fields.

Data entry in MacTRAC is only checked by the system to see that it conforms to data type definitions; thus dates must be dates but state codes needn't be valid. Existing data cannot be viewed during data entry. No tools are provided to assist in rapid entry of numerous similar records except a copy complete record function. Mass deletion, replacement and archiving functions are provided. Coded fields for donation SOURCE, DESCRIPTOR, SOLICITORS, AFFILIATION, and payment FUND, REASON, PAYMENT METHOD, allow users to define their own code and explosion values, but not while in data entry mode. In addition, the code definition function in the release I used was corrupted: I added a SOURCE value which also validation it as a REASON and added a FUND value which was also validated as a METHOD.

Recording transactions in MacTRAC is quite easy. When the user chooses to enter a new transaction, a template requesting the amount, date, reason, fund, method of payment and type of transaction (gift, dues, pledge, payment) appears. Gifts and dues are considered received. Payments are matched to pledges. Pledges may be recorded with first dates of payment a periodicity of future payments. The system is not very smart; when I had a \$500 pledge open it credited a \$1M payment again the

pledge without asking for verification even though the recorded reason for the two gifts was different.

MacTRAC supports two kinds of searching: users may search for a record by the name of the donor during data entry/edit/modify or may use the report writer extracting function to write a report. In the first instance, the user may retrieve a record only by exact match of a name. If the match is less than exact, and the user does not want to create a new record, he or she will see a list of records in alphabetical order following the character string entered in the query (rather than the entries surrounding the string on both sides) and may select one to view. The extraction routine permits the user to articulate a multi-term query searching a limited number of fields (name, company, zip, individual/organization, action date, other date, comment field text, and coded fields. These search logics may be saved under a user defined name. In the version of the software I used, the search did not correctly retrieve individuals and organizations and did not correctly sort the resulting file by company names as requested.

MacTRAC links transactions to donor records so that at any time a user may view GIFTS and \$SUMS. The first is a screen listing all gifts, pledges and dues by date, amount, description reason, and fund; the latter list first and most recent gift, and summarizes three year giving history: this year, last year and past two years. Although this is intended to provide an online status report, the giving summary did not reflect gifts I entered as having been received in this year. I suspect the reason was that the file needed re-indexing, but frankly by this time I had experienced enough glitches in this package that I didn't check.

MacTRAC an inexpensive, basic, fundraising package but the number and seriousness of the software bugs and design oversights I encountered makes it difficult to recommend. I'm still waiting for a competent, MacIntosh, fund raising system.



## ACCESSION 2.0

[OakTree Software Specialists, 515 East Altamonte Drive, Suite 250-9A; Altamonte Springs FL 32701; 407-339-5855] \$995 for single user with additional templates at \$200 each; multi-user systems begin at \$2000 and run to \$6000 for 7 users with maximum costs for 7 users and 4 additional templates for each at \$9000. Full function demo disk limited to 50 records, with 32p. tutorial handbook, available for \$20. Maintenance @ 20% of purchase price annually. Runs on any Mac, Finder version 6.03 and later, with hard disk. Reviewed on a MacSE and a Mac IIfx.

Accession 2.0 retains the best features of Accession 1.0, including its unbeatable price, while adding powerful new capabilities such as multi-user and extended collections management capabilities. With the release of Accession 2.0, there is finally MacIntosh based software that can be recommended to any art or cultural history museum. (I did not review the templates for archives,

natural history and paleontology museums. Archology and Geology templates are still under development.)

In volume 4#1 (Spring 1990) of *Archives and Museum Informatics* I gave an overwhelmingly positive review to Accession 1.0., noting a few minor problems in a generally well designed and clearly documented system. Accession 2.0 answers nearly all the criticisms I made (it still doesn't do thesauri) while preserving the strengths of Accession 1.0. This review of the latest release does not revisit the ground covered by the earlier report, so readers should look over that earlier, and more complete, review.

Accession 2.0 supports much more diverse data than the earlier release which had only four files. In Accession 2.0 any of a dozen "standard" accessory files and more than a dozen additional files, may be opened at any time, and can be linked to each other so that they will, usually, remain in sync. (There are times when moving backward through a search set that the links can get out of sync). Users may modify such linked records and vocabulary lists for authorized names and classification systems during the record editing process. Each type of collection (Art, History, Archives, Natural History, Paleontology, Archaeology, Geology) comes with those additional templates which are logically required for the management of that kind of collection. Users can add, modify or view information about an item in a discipline-defined "collection" and use simple tools to make any field any size needed, change its prompts, change its definition for the duration of the session or as a default, and set password to control either data or operations for either individuals or groups. In Accession 2.0, explicit whole-part relations may be defined and a variety of methods are provided to link related parts and wholes as well as to indicate if the parts are components or pieces, and to track them even if all are not owned by the museum.

Accession 2.0 provides extremely sophisticated methods of handling complex data specific to museums. Users may define the concept of "circa" dates differently for dates stated as year only, year-month, and year-month-day so that they will be included or excluded from date range searches and from "before" and "after" searches. Users may define numerical values and measurement fields so that they will automatically translate between English and metric measures with the desired precision. Whole lists of terms can be imported to vocabulary lists as text files and used immediately to control data entry. Extended text notes can be defined so as to prompt users with a template the institution wants to use to record data.

Like Accession 1.0, the new release provides powerful searching tools. In addition, Accession 2.0 searches across files with the same tools as searching within files. Reporting across multiple files can be very complex, and may incorporate any fields from any of the files. Full text searches through "literal text" fields can be character string, full word, multiple word or character string, and use Boolean operators. Search criteria and results can be viewed simultaneously. My only quibble is that in order to get a count of the number of records hit in a search, the user must use the (default) "report" option.

Collections management involves scheduling and tracking actions performed on objects over time. Accession 2.0 supports recording of information about acquisition, measurement, registration, location, conservation, exhibit, loan-out, loan-in and deaccession in "templates" or record types, provided for all collections, with specialized actions included in the software provided for certain collections (such as valuation for art). Reproduction, shipping, and insurance are available as "additional templates" at extra cost. But what makes these features useful is not that the information can be recorded (since it could be recorded as full text even in Accession 1.0), but that it is designed to be used. At any point, the user of Accession 2.0 can ask for an "Action List" for an object open on the screen, modified by date range if desired, and be shown a list of all actions related to that object. The action list can show past or scheduled actions, and be limited to certain types of actions or include all. Action lists can also be defined as reports, allowing complex types of action reports to be defined, saved under user names, and run on command.

While the multiple window features work on any level of Macintosh, larger monitors are clearly advantageous for keeping a large number of windows open at once. While it slows the system slightly, I found it desirable to keep many windows open and to have them synchronized while doing any kind of collections management; unfortunately the system does not allow a user to define a default system initiation option which would define which templates were open, which were linked, and where they appeared on the screen. Setting up a session now involves making each of these decisions and takes a bit of time.

I did not run Accession 2.0 in a networked environment or build a large database to test the software fully, so I am not able to comment directly on its networking facilities or the software/hardware interactions that would influence its speed under those conditions. Needless to say, these performance variables are important and customers considering Accession 2.0 for use in a multi-user environment should discuss performance with OakTree and incorporate mutually acceptable performance measures into their contracts until a body of multi-system user experience is available on which they can rely. I did test out the password assignment and control features of Accession which permit the definition of both the functions a user or group of users may perform and the data on which they may perform them.

In eighteen months on the market, Accession has proven its worth to many museums. Now that it has grown into a multi-user system and dramatically strengthened its collections management facilities, it competes with systems four to ten times its price. Roy and Helen Brown have listened carefully to their customers and responded with a product which I found easy to use, provided with literate on-line and paper based documentation, and exceptionally reliable. While I certainly look forward to further evolution, it would be unfair not to welcome this fully capable package to the small but growing universe of acceptable museum systems.

## GENCAT: Version 2.32,

GENCAT [Eloquent Systems Inc., 25 - 1501 Lonsdale Ave., North Vancouver, V7M 2J2, CANADA; 604-980-8358, fax 604-980-9537, USA Toll free 800-663-8172] \$5000 plus LAN version fee of \$1500 for every 4 users. Includes run-time license for Advanced Revelation. Minimum configuration for IBM AT or compatible with 640K RAM and hard disk. Network support for IBM-PC and Token Ring, Novell Netware, HP OfficeShare, 3-COM Ether Series 3+, Nestar Plan 3000/4000, AT&T StarLAN, Banyan VINES, PC-MOS multiuser.

GENCAT stands for GENERIC CATaloging which is the functionality of this package which its authors sometimes subtitle "An Eloquent Searchware Product". It is one of three products built on the Advanced Revelation DBMS which is sold by Eloquent Systems, a small Canadian software developer. The other two products, The Eloquent Librarian and Eloquent-RM or records management, are applications configured for specific settings. The professed strength of GENCAT is that it can be applied to any setting or type of collection. An application for museums has been developed by the Saskatchewan Heritage Information Network based on the CHIN data standards and standard receipt, transfer, loan, and cataloging forms and a data structure supporting profiles of individuals and organizations but this was not provided to me for the review. I have seen it advertised under the name M\*A\*G\*I\*. So what I am reviewing here is more a toolset than an application.

The complete package, with modules for thesauri and hierarchical authority control files comes in a looseleaf binder of several hundred pages of documentation and four disks. Installation proceeds as instructed, requiring about 30 minutes and resulting in 90 files, five sub-directories and 2-3 MB of disk utilization.

After providing a password on the opening screen, GENCAT reveals a main menu consisting of seven options: Configuration; Utilities; Table Data; Item Data; Indexes; Research Collection; Other Functions. Since the system advertises contextual help throughout, this seemed a good time to invoke it, but the pop-up window for Configuration read "If you press enter, you will invoke the option: Configuration", which is what I already knew. On the next occasion that I used help, the pop-up window was blank, and several other tries were not very helpful. Obviously help is intended by GENCAT's designers to be a utility which will be populated by the application developer.

The HELP experience prepared me for the rest of what I learned. It was relatively easy to follow directions in the GENCAT manual to set up a new database, field by field. Although not all the references in the manual are entirely consistent (I was sent to 2-11 and 2-12 for data that turned out to be on 2-13 and 2-14), the instructions

were marvelously clear when compared to Advanced Revelation's own notoriously poor documentation. Default data entry and information retrieval screens contained the data fields that I set up in a (modifiable) default sequence. I found setting up new screens for data entry or retrieval a simple matter and they appeared as options on the user screens as advertised. Complex data entry controls, including an accession number picture which required entry in the form NNNN-NNN-NNN-NN and then sorted properly by year of accession, accession lot, item number and part number, and pointers to value tables, thesauri and hierarchical files which activated pop-up windows for authorized values, were quite easy to define. Of course, developing a prototype collections management database structure using these tools, assuming the designer knew exactly what was desired and had reasonable facility with computers, would still require several weeks and tuning it, defining the reports needed by users (another field by field process), and setting up the networking permissions and configuration controls would require many more months.

In general, the features provided by GENCAT are those of Advanced Revelation, as described in Penny Small's review in *Archives and Museum Informatics* vol.2#1, Spring 1988. The few glitches I uncovered (ESC in Help copies the line on which your cursor resides; fields don't wrap when additional text is added beyond the window, the text just moves left) belonged to Advanced Revelation. Indeed, as far as I can see, GENCAT is very little more than a run-time version of Advanced Revelation packaged with clear documentation of its most general facilities. Before it will have much success in the museum market, Eloquent will have to provide an application that more tailored to museum data and functional requirements. I hope the application developed with the Saskatchewan Heritage Information Network will fit that bill.



## ENCORE

Encore [A.R.T.Systems, 18 East 16th St., New York, NY 10003-3111; 212-741-1906] Demo/presentation disk. Allow 30 minutes to run. Encore itself operates on PC's, using DBase, and comes with DVI compression software for images. Sold as a turnkey system with a 386 processor it begins at \$27,000.

ENCORE is intended for galleries and collectors but the client list includes The Jewish Museum and the Warhol Foundation so it looked worth exploring. The demonstration disk is in two parts: Database Introduction and Process Demonstration. The database consists of three files: Client, Inventory, and Transactions. The client functions include Edit, Report, Labels, and Merge with word processing. In the edit function a user can do a quick search by code, name, corporation or add a new record. The client record has three pages plus links. The first page consists of mail list data, the second of contact records sorted by date with free text, and the third of a

free text note. Links can be made to a coded interest value table, to inventory, and to transactions. Fields appear to be fixed length with usual DBase limitations.

The Inventory functions include Edit, Post expenses and Report. Edit provides for a quick search by code, artist, title, or culture and to add new records. The record is a single screen overview of a work (title, description, signed, condition, etc. with classifications by artist, culture, status (of ownership/sale) location etc. with pop-up screens for source, price, expresses and other data relevant to gallery management of the object.

Transaction functions include adding transactions, invoicing and following through the rest of billing cycle. The Edit facility provides a quick search by code, name, or corporate name. Record includes all necessary data on billing and discounts with a pop-up for shipping label. The system includes data about "Partner/Consignor" whose functions include edit people, payments to people, receipts from people and "Master files", or value tables, for classifying people (interests), inventory (period, style etc.), and transactions (types). It is not clear from the demo disk whether new tables could easily be created or how values in these might be changed.

The Process section of the demo disk shows how Encore was used to track a relationship between an artist, a painting, the gallery and the purchasers from the time of the initial contact. The process involved setting up the artist record, contact by visiting gallery, negotiating to take works, advertising for a show, sending out invitations to the opening, recording reactions of patrons visiting the show, following up on an interested visitor, allowing the works out on approval, gathering more data on the client and developing a contact profile of this person, selling the item, billing, assigning the receipts, paying the artist, and calculating net profits.

The demo disk does not provide any illustration of the way in which Encore manages images. We know from the literature that it uses the Q Systems DVI based software for this, but the actual degree of integration and the appearance of the user interface is not demonstrated in this disk. Obviously this would be of interest to a potential buyer, as it is one of the few reasons they might be willing to pay the otherwise high asking price.

On the whole Encore seems reasonably well suited to a gallery, less so to a private collector. Would it suit a museum? The data a small museum might need is there but the interface makes assumptions that would be disconcerting to museum management. Perhaps all that is needed is a new view of the database. A.R.T. Systems is looking for a museum partner to be a beta site and help them to make the transition to museum requirements. Meanwhile, Encore can't really be considered a museum system in its current form, and A.R.T. will need to understand the museum market, especially its pricing structures, if they hope to succeed.



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## SOFTWARE NOTES

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### GETTY TRUST ART HISTORY INFORMATION PROGRAM

At the MCN meeting, the Getty Art History Information Program displayed an impressive array of electronic products. The **Authority Reference Tool (ART)** makes the use of authority resources such as the **Art & Architecture Thesaurus** easier. It was demonstrated with the **AAT**, with which it will soon be distributed, but it is intended also to be used with other AHIP resources such as the **Union List of Artists Names (ULAN)** and the **Thesaurus of Art-Historical Place Names (TAP)**. The beta version, which I explored, provided a view of the hierarchy, the alphabetical lists, or any individual term with an interface to popular commercial word processors and database packages. As advertised, it was generally intuitive and pleasant to use. While writing in a word processor, the user could look up a term in the **AAT**, explore the thesaurus for more appropriate terms, and then paste the desired term into his or her text. Searches for the closest related term used all terms in the **AAT**, but did not use words in the scope notes which on at least one occasion I thought might be useful. If the user was building a database, this interface to the **AAT** would make it unnecessary to have an integrated thesaural capability within their database software.

**Synonym** is a series of software routines that match pairs of names which vary in specified ways. First the system checks for exact matches, followed by tests for one character substitutions, character transpositions, differences in punctuation, initials standing for names, extended names only partly present, inclusion of names within names, missing first names, word approximations, differences in dividing names and character approximations. It reports on probable matches found using each technique so that a final judgment can be made by a specialist as to whether two forms of a name in different databases refer to the same person and are simple typos, different transliterations, different usages for periods of a persons life or reflect one of many other sources of variation in names. While intended to support art historical research, the 'C' language source program would be equally applicable to mailing list duplicates.

I missed the demonstration of the **Union List of Artists Names** but I recommend that you try to see it if you can. **ULAN** is an innovative approach to the concept of multiple authorities which reflects the reality that different organizations do, and will continue to, rely on different sources and will make different decisions regarding usage even though the real-life entities for which they are providing names are singular. In **ULAN**, a user can see at a glance the various "authorized" usages of names for the same individual by each of the Getty related projects and the source of the variations used by each project.

At separate demonstrations the AHIP program also showed off the **Witt Computer Index** (50,000+ works of art from the American School), the **Provenance Index** (sources of works purchased at auction), and work being done on image resolution requirements of art historians. It is exciting to see AHIP efforts beginning to contribute in so many useful ways to the field. I look forward to learning about the experience of museum professionals using these new tools.



### THE RETAILER

The Retailer is a point of sale, inventory control system designed for small retail operations like museum shops. It runs on IBM compatible PC/XT/AT and PS/2's using terminals or electronic cash registers with scanners. Its integrated modules manage inventory, pricing, customer records and re-ordering functions and optional modules include word processing, advanced report generation, member billing, barcode label printing, accounting and numerous other capabilities. [Sierra Associates, 1157 Triton Dr., Suite A, Foster City CA 94404; 415-349-9647]



### RLG AMIS UNDERWAY

The Research Libraries Group is distributing literature describing its Archives and Museum Information System currently under development. The system is intended to provide both for local collections management and interactive access to **RLIN** for inter-institutional sharing of information about research materials. Andrew Roberts who directed the Museum Documentation Association of the UK for more than fifteen years, is the principal consultant in this phase of the development. RLG expects to have a prototype to demonstrate in 1992. (Contact: Alan Tucker, The Research Libraries Group Inc., 1200 Villa St., Mountain View CA 94041-1100; 415-691-2242).



### STAR

**STAR** is now accompanied by a simple menu interface for occasional users in addition to the standard command interface which it has offered in the past. Recent additions of the ability to handle images as well as text and a new pricing structure which begins at \$2000 for a single user license on any of over 150 platforms including '386 and '486 based PC's and many other UNIX systems, means that **STAR** should be seriously considered in any archives or museum purchasing decision. [Cuadra Associates, 11835 West Olympic Blvd., Suite 855, Los Angeles CA 90064; 213-478-0066]



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## STANDARDS

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### USMARC AUTHORITY FORMAT UPDATE

The latest additions and changes to the USMARC Format for Authority Data (1987) are available in Update #4 (June 1991) from the Cataloging Distribution Service, Washington DC 20541-5019; 202-707-6100. The changes include clarification of the Guidelines for Applying Content Designators.



### INTERACTIVE ELECTRONIC TECHNICAL MANUALS

A Tri-Service Working Group has issued three draft military specifications for interactive technical manuals. If these become final, they could have a significant impact on the design of interactive software tools in the near future. MIL-D-IETMDB "Database, Revisable: Interactive Electronic Technical Manuals, for the support of" MIL-M-GCSFUI "Manuals, Interactive Electronic Technical: General Content, Style, Format and User-Interaction Requirements" MIL-Q-IETMQA "Quality Assurance Program: Interactive Electronic Technical Manuals and Associated Technical Information; Requirements for" [Available for public comment: Code 1223, David Taylor Research Center, Bethesda MD 20084]



### ANSI/NISO Z39.50 Version 2

A draft revision of the ANSI/NISO Z39.50 Information Retrieval Application Service Definition and Protocol Specification for Open Systems Interconnection is available for comment. The standard incorporates changes necessary to align the standard with its international counterpart ISO 10162/10163 known as the Search and Retrieve Service Definition and Protocol Specification. [NISO, P.O.Box 1056, Bethesda MD 20827; 301-975-2814] \$30.



**Facilities Standards for Art Libraries and Visual Resources Collections** edited by Betty Jo Irvine (Englewood CO, "Libraries Unlimited, 1991) 216p.

Twenty-six chapters discussing standards ranging from standards for needs assessments for a building program to standards for rest rooms and covering all areas and programs of an art library with implications for facilities in between. The references and the bibliography are quite useful and often the specific standards referenced are not readily available elsewhere, but in general I found the discussion, and the proposed standards, too general. The standards suggested for computerization all have to do with ergonomics and seem to ignore the challenges posed by the opportunities which telecommunications create for resource usage outside the confines of the building.

### CIMI ADOPTS STRATEGY

At its meeting of November 3-4 in Santa Monica the Committee on Computer Interchange of Museum Information reviewed a briefing paper entitled "Options for Technical Protocols" prepared by Project Manager John Perkins, and adopted the general approach to identifying appropriate protocols for museum data interchange which it proposed. The framework elaborates on a matrix which was sketched at the spring 1991 meeting: museum applications are on one axis, and technical standards are on the other. For those applications for which existing technical standards are adequate, the paper recommended that no special standards be developed for use by museums. For those applications most specific to museums, implementations of existing standards will be examined to determine how well they could satisfy museum needs.

In the two days it met prior to the Museum Computer Network conference, the CIMI Committee identified a number of applications which were fully satisfied by existing standards, and two classes of applications which were museum specific. For those museum data interchange needs which involve standards for data transmission methods (file exchange or facsimile transmission, for example) or where the application corresponds to and application found in other institutions (such as electronic mail or electronic data interchange for business transactions such as billing and ordering), CIMI will propose that museums adopt International Standards Organization (ISO) standards for Open Systems Interconnection (OSI). In two cases in which the museum requirement is distinctive - data on collections and their history and transactions involving the loan of collection objects - the Committee identified three existing standard approaches to data interchange and asked its Project Manager to prepare examples of how each of the three might accommodate museum data for consideration at the Spring 1992 meeting in Washington DC. (April 21 and 22, and like all CIMI meetings, open to public observers).

At the spring meeting CIMI members should see the advantages and disadvantages of ISO 2709 (the parent of the MARC formats), ISO 8879 (Standard Generalized Markup Language) and ISO (Abstract Syntax Notation 1) as applied to interchange of the same museum information in a hypothetical museum application, thereby enabling them to establish criteria to decide between them and to select an approach that will be the basis for experiment over the next two years with task forces of museum representatives for a variety of kinds of institutions and areas within institutions.

With the adoption of this strategy, CIMI has established a framework for selecting a suite of standards that will form the museum protocols for data interchange and the criteria for inclusion of future standards within that suite. [Contact John Perkins, CIMI Project Manager,